E Series Calibration Procedure

Version 2.0

Contents

322314A-01

January 1999

Introduction

The following procedure contains information on the calibration of National Instruments E Series data acquisition (DAQ) products, including step-by-step instructions for verifying and calibrating these products. The device driver supplies software routines to perform the verification and adjustment. You must write the appropriate software to call these routines during calibration.

This document will not discuss programming techniques or compiler configuration because of the number of programming languages and programming styles that can be used to perform calibration. The National Instruments DAQ driver, NI-DAQ, contains a number of online help files that contain compiler-specific instructions and detailed function explanations. You can add these help files when you install NI-DAQ on the calibration computer.

Explanation of Calibration

Calibration refers to a procedure of reading offset and gain errors from a DAQ board and updating special analog calibration circuitry that will correct these errors. Every E Series product is calibrated at the factory. During the factory-calibration procedure, the calibration constants—values used to update the analog calibration circuitry—are stored in nonvolatile memory on the board. These values are loaded from memory and used as needed.

Why Calibrate?

Offset and gain errors may drift with time and temperature. As a result, the calibration constants determined at the factory may no longer be valid once the board calibration interval has expired. To achieve the specified accuracy of the board, it must be calibrated.

Explanation of Calibration Constants

The E Series boards all have nonvolatile memory—EEPROMs—used to store the calibration constants. When the board is initialized prior to taking measurements, the calibration constants are written to the calibration digital-to-analog converters (CALDACs). The CALDACs output an analog voltage proportional to the calibration constants. These voltages modify the incoming or outgoing analog voltage path in a way that will cancel any offset or gain errors. Depending on your board, there may be CALDACs specifically for unipolar analog input, bipolar analog input, unipolar analog output, or bipolar analog output.

You can store different sets of calibration constants on the EEPROMs on the boards. When the board is calibrated at the factory, the calibration constants are stored in a read-only portion of the EEPROM. Until you self-calibrate the board, the CALDACs use the factory-calibration constants when the board is initialized.

Frequency of Calibration Recommendations

E Series products should be calibrated at a regular interval that can be defined by the measurement accuracy requirements of your application. National Instruments recommends that you perform a complete calibration at least once every year. You can shorten this interval to 90 days or 6 months if desired.

Calibration Options

E Series products have two different calibration options. One is internal or self-calibration. The second is external calibration. Both of these calibration modes remove error from measurements. A metrology laboratory will perform an external calibration on the board, adjusting the calibration constants with respect to a traceable standard.

External versus Internal Calibration

Internal calibration is a much simpler calibration method that does not rely on external standards. Instead, the board calibration constants are adjusted with respect to a high-precision voltage source that exists on the board. Use

this type of calibration after the board has been calibrated with respect to an external standard, but is placed in an environment where external variables such as temperature may affect measurements. The new calibration constants are defined with respect to the calibration constants created during an external calibration. This ensures that the measurements can be traced back to the external standards. In essence, this type of calibration is similar to the auto-zero found on a digital multimeter.

External calibration requires the use of high-precision external standards. During external calibration, the onboard calibration constants are adjusted with respect to external standards. Once the onboard-calibration constants have been adjusted, the high-precision voltage source on the board is adjusted. This type of calibration is reserved for metrology laboratories or other facilities that maintain traceable standards. External calibration must be performed in a controlled environment with traceable standards.

External Calibration Procedure

Once performed, an external calibration provides a set of calibration constants that are used to adjust the measurements taken by the DAQ board. During external calibration, you use external standards to supply and read voltage levels. Then, you make adjustments to the board calibration constants to ensure that the reported voltages fall within the board specifications. The new calibration constants are then stored in the board EEPROM.

What to Expect from External Calibration

Automated calibration procedures can reduce the total time required to perform calibration and verification to approximately 10 minutes. However, manual calibration and verification can take as long as 1 hour. You can automate the adjustment and verification procedure if you have access to programmable standards such as the Fluke 5700A or HP3458A. You can control these devices via a GPIB connection. You can then program the entire procedure to save time and effort.

Recommended Test Equipment

During an external calibration of an E Series board, the analog inputs, outputs, and precision voltage source are calibrated. When performing an external calibration, it is necessary to use a high-precision voltage source. The source must be more accurate than the A/D converter (ADC) on the board. When calibrating a 12-bit board, your source should be at least 50 ppm (0.005%) accurate. When calibrating a 16-bit board, your source should be at least 10 ppm (0.001%) accurate. For example, when supplying an external 10 V (full-scale) calibration voltage to a 12-bit board, the source

must be accurate to within 500 µV. However, when supplying the same signal to a 16-bit board, the source must be accurate to within 100 µV.

National Instruments recommends that you use the following instruments for calibration:

- Calibrator—Fluke 5700A
- DMM—Hewlett-Packard 3458A
- Counter—Hewlett-Packard 53131A

If the exact instrument is not available, use the accuracy requirements described above to select a substitute calibration standard.

Depending on whether or not you have custom connection hardware available, you may require a connector block such as the National Instruments TBX-68 and a shielded 68-pin connector cable. These components give easy access to the individual pins on the 68-pin board I/O connector.

Test Considerations

To calibrate an E Series board, there are a number of issues to consider. First, you must install the NI-DAQ driver on the calibration computer and properly configure the board to be calibrated. Next, you must write calibration software to communicate with the board via NI-DAQ function calls.

Required Software

The E Series DAQ board is a PC-based measurement device. Therefore, you must ensure that the proper board driver is installed in the calibration system prior to attempting any calibration. The E Series calibration procedure requires that the latest version of the National Instruments NI-DAQ driver be installed on the calibration system. This driver configures and controls the DAQ board. You can obtain the latest version of the driver from the National Instruments web site at `www.natinst.com`.

The driver supports a number of programming languages, including LabVIEW, LabWindows/CVI, Microsoft Visual C++, Microsoft Visual Basic, and Borland C++. When you install the driver, you only need to install support for the programming language that you intend to use.

To obtain the documentation that explains the use of the NI-DAQ driver, install the following online manuals:

- *NI-DAQ Function Reference Manual for PC Compatibles*
- *NI-DAQ User Manual for PC Compatibles*

These two manuals contain detailed information on using the NI-DAQ driver. The function reference manual includes detailed information on the functions in the driver. The user manual provides instructions on installing and configuring National Instruments DAQ devices. This manual also includes detailed information on creating applications that use the NI-DAQ driver. These manuals are your primary references for writing your calibration utility. For further information on the products you are calibrating, you may also want to install the device user manuals.

You also need a copy of the `niECal.dll`, `niECal.lib`, and `niECal.h` files. This `.dll` provides calibration functionality that does not reside in the standard NI-DAQ driver. This functionality includes protecting the calibration constants and updating the calibration date. You can access the functions in this `.dll` through any 32-bit compiler. These files are on the National Instruments web site at `www.natinst.com`.

Writing Your Calibration Procedure

The calibration process is described in the *Calibration Process* section later in this document, including step-by-step instructions on calling the appropriate calibration functions. Unless otherwise specified, the calibration functions that are referred to are C function calls in the NI-DAQ driver. These function calls are also valid for Visual Basic programs. While LabVIEW virtual instruments (VIs) are not discussed in this procedure, the translation from NI-DAQ function calls to LabVIEW VIs is straightforward, as many of the VIs have the same names as the listed function calls. Refer to *Flowcharts for Creating Verification and Calibration Code* for flowcharts detailing the code used at each step of the calibration procedure.

There are often a number of compiler-specific steps that you must follow to create an application using the NI-DAQ driver. The *NI-DAQ User Manual for PC Compatibles* details the required steps for each of the supported compilers.

Be aware that many of the functions listed in the calibration procedure in the *Calibration Process* section of this document use variables that are defined in the `nidaqcns.h` file. To use these variables, you must include the `nidaqcns.h` file in your code. If you do not wish to use these variable definitions, you can examine the function call listings in the NI-DAQ documentation and the `nidaqcns.h` file to determine what input values are required.

Environmental Issues

You need to be aware of several connection and environmental concerns during calibration:

- Long lead lengths—keep connections to the DAQ board as short as possible. Long cables and wires can act as antennae. Such a cable could pick up extra noise that would affect measurements.
- The temperature should be between 18 and 28 °C.
- Relative humidity should be below 80%.
- All cable connections to the board should be shielded copper wire. It is often advisable to use twisted-pair wire to eliminate noise and thermal offsets.
- Allow a warm-up time of at least 15 minutes for PXI/PCI/AT bus boards and 30 minutes for PCMCIA cards to ensure that the measurement circuitry is at a stable operating temperature.

Calibration Process

The calibration process is broken down into three steps:

1. Verify the existing operation of the board. This step allows you to confirm that the board was or was not operating within its specified range prior to calibration.
2. Perform an external calibration that adjusts the board calibration constants with respect to a known voltage source.
3. Perform another verification to ensure that the board is operating within its specifications after calibration.

These steps are described in detail in the following sections. As a complete verification of all of the board's gains and ranges can take some time, you may wish to only spot-check the gains and ranges of interest to you.

Initial Setup

NI-DAQ automatically detects all E Series devices except DAQPad devices. However, for the driver to communicate with the boards, it must be configured in NI-DAQ. The following sections provide a brief description of the configuration procedure. For further information on configuration problems, refer to *Installation and Configuration Issues*. The following procedure describes how to configure a board in NI-DAQ:

1. Install the NI-DAQ driver software.
2. Turn off the power to the computer that will hold the board and install the board in an available slot.

3. When the computer powers up, launch the Measurement & Automation Explorer.
4. Configure the board device number and use the **Test Resources** button to ensure that the board is working properly.

Your board installation and setup is complete.

☞ **Note** ***Once a board is configured with the Measurement & Automation Explorer, the board is assigned a device number. Each function call uses this number to identify which DAQ board to calibrate.***

E Series Verification Procedure

The verification procedures provide a method to determine your confidence in how well the DAQ board is meeting its specifications. Based on the information obtained from this procedure, you can begin to obtain historical information about the DAQ board. You can use this information to help determine the appropriate calibration interval for your application.

The verification procedure is divided into the major functions of the board. At this point, you need to refer to the *E Series Board Specifications* section later in this document for the unique specifications of each board. Keep these specifications available, as they are used throughout the entire verification process.

Analog Input Verification

Since the E Series board has a number of different ranges and polarities, you need to check measurements for each available range/polarity combination. Because there is only one ADC on E Series boards, you only need to perform verification on a single analog input channel. Use the following procedure to check the performance of the analog input:

1. Make sure that you have read the *Test Considerations* section earlier in this document.
2. Calibrator connections depend on the resolution of the board you are calibrating. Use the following guidelines to determine the connections between the board and the calibrator for analog input verification:
   - Connect the positive output of the calibrator to analog input channel 0 (pin 68).
   - Connect the negative output of the calibrator to analog input channel 8 (pin 34).

☞ **Note** ***Pin numbers are given for 68-pin connectors only. If you are using a 50-pin connector, refer to the board user manual for signal connection location.***

3. Choose the data sheet from the *E Series Board Specifications* section later in this document that corresponds to the board you are verifying. This sheet shows all acceptable settings for the board type. Although it is recommended that all ranges and gains be verified, you may wish to save time by checking only those ranges that are used in your application.
4. Set the calibrator voltage to the test value indicated on the board data sheet.
5. Run the `AI_Configure` function to configure the board for the appropriate device number, input range, and polarity. Read these settings from the data sheet for the board.
6. Run the `DAQ_Op` function to acquire 10,000 points of voltage data. Set the `gain` variable to the value specified by the board data sheet.
7. Run the `DAQ_VScale` function to convert the buffer of acquired binary values into voltage values.
8. Average the 10,000 voltage values. Compare the resulting average to the upper and lower limits listed in the data sheet. If the result falls between these values, the test is considered to have passed.
9. Repeat steps 5 through 8 until all values have been verified.
10. Disconnect the calibrator from the board.

You have finished verifying the analog input levels on your board.

Analog Output Verification

This procedure checks the performance of the analog output. Skip this step if the board you are calibrating does not have analog output circuitry. Check measurements using the following procedure:

1. Make sure that you have read the *Test Considerations* section earlier in this document.
2. Most E Series boards have two analog outputs, DAC0OUT and DAC1OUT. This test will check both analog output channels. Connect your DMM to DAC0OUT as shown in Table 1.

Table 1. Connections to Analog Outputs

Analog Output	DMM Positive Input	DMM Negative Input
DAC0OUT	DAC0OUT (pin 22)	AOGND (pin 55)
DAC1OUT	DAC1OUT (pin 21)	AOGND (pin 55)

Note ***Pin numbers are given for 68-pin connectors only. If you are using a 50-pin connector, refer to the board user manual for signal connection location.***

3. Choose the data sheet from the *E Series Board Specifications* section later in this document that corresponds to the board you are verifying. This sheet shows all acceptable settings for the board. Although it is recommended that all ranges be verified, you may wish to save time by checking only those ranges that are used in your application.
4. Run the `AO_Configure` function to configure the board for the appropriate device number, channel, and output polarity. Use channel 0 as the channel to verify. Read the remaining settings from the data sheet for the board.
5. Run the `AO_VWrite` function to update the analog output channel with the appropriate `voltage`. Use the voltage value to be tested shown on the data sheet for the board.
6. Compare the resulting value shown by the DMM to the upper and lower limits on the data sheet. If the value falls between these limits, the test is considered to have passed.
7. Repeat steps 4 through 6 until all values have been tested.
8. Disconnect the DMM from DAC0OUT and reconnect it to DAC1OUT, making the connections as shown in Table 1.
9. Run the `AO_Configure` function to configure the board for the appropriate device number, channel, and output polarity. Use channel 1 as the channel to verify. Read the remaining settings from the data sheet for the board.
10. Run the `AO_VWrite` function to update the analog output channel with the appropriate voltage. Use the voltage value to be tested shown on the data sheet for the board.
11. Compare the resulting value shown by the DMM to the upper and lower limits on the data sheet. If the value falls between these limits, the test is considered to have passed.
12. Repeat steps 9 through 11 until all values have been tested.
13. Disconnect your DMM from the board.

You have finished verifying the analog output levels on your board.

Counter Verification

This procedure verifies the performance of the counter. The E Series boards have only one timebase to verify, so only counter 0 needs to be checked. It is not possible to adjust this timebase, so only verification can be performed. Perform checks using the following procedure:

1. Make sure that you have read the *Test Considerations* section earlier in this document
2. Connect your counter positive input to GPCTR0_OUT (pin 2) and your counter negative input to DGND (pin 35).

Note ***Pin numbers are given for 68-pin connectors only. If you are using a 50-pin connector, refer to the board user manual for signal connection location.***

3. Run the `GPCTR_Control` function with the `action` set to `ND_RESET`. This places the counter in a default state.
4. Run the `GPCTR_Set_Application` function with `application` set to `ND_PULSE_TRAIN_GNR` to configure the counter for pulse-train generation.
5. Run the `GPCTR_Change_Parameter` function with `paramID` set to `ND_COUNT_1` and `paramValue` set to `2`. This configures the counter to output a pulse with an off time of 100 ns.
6. Run the `GPCTR_Change_Parameter` function with `paramID` set to `ND_COUNT_2` and `paramValue` set to `2`. This configures the counter to output a pulse with an on time of 100 ns.
7. Run the `Select_Signal` function with the `signal` and `source` variables set to `ND_GPCTR0_OUTPUT`. This will route the counter signal to the GPCTR0_OUT pin on the board connector.
8. Run the `GPCTR_Control` function with the `action` variable set to `ND_PROGRAM` to start the generation of a square wave.
9. The board will begin to generate a 5 MHz square wave when the `GPCTR_Control` function completes execution. Compare the value read by your counter to the test limits shown on the board data sheet. If the value falls between these limits, the test is considered to have passed.
10. Disconnect the counter from your board.

You have verified the counter on your board.

E Series Calibration Procedure

You use the E Series calibration procedure to adjust the analog input and output calibration constants. At the end of each calibration procedure, these new constants are stored in the factory area of the board EEPROM. It is not

possible for a user to modify these values. This provides a level of security that ensures users will not accidentally access or modify any calibration constants adjusted by the metrology laboratory.

This step in the calibration process calls functions from the NI-DAQ driver as well as functions from the `niECal.dll`. For further information on the functions in the `niECal.dll`, refer to the comments in the `niECal.h` file.

Perform adjustment of the analog inputs with a calibrator using the following procedure:

1. Make sure that you have read the *Test Considerations* section earlier in this document
2. The calibrator connections depend on the resolution of the board you are calibrating. Refer to Table 2 to determine connections between the board and the calibrator.

Table 2. Calibrator Connections

12-Bit E Series Device	16-Bit E Series Device
Connect the positive output of the calibrator to analog input channel 8 (pin 34).	Connect the positive output of the calibrator to analog input channel 0 (pin 68).
Connect the negative output of the calibrator to AISENSE (pin 62).	Connect the negative output of the calibrator to analog input channel 8 (pin 34).
Connect DAC0OUT (pin 22) line to analog input channel 0 (pin 68).	—
If your calibrator and computer are floating with respect to each other, connect the negative output of the calibrator to AISENSE (pin 62) and AIGND (pin 29).	If your calibrator and computer are floating with respect to each other, connect the negative output of the calibrator to the AIGND line (pin 29) and the analog input channel 8 (pin 34).

☞ **Note** ***Pin numbers are given for 68-pin connectors only. If you are using a 50-pin connector, refer to the board user manual for signal connection location.***

☞ **Note** ***If you are calibrating a DAQCard-AI-16XE-50, you will need to make the connections as if the board were a 16-bit device.***

3. To obtain the date of the last calibration, run the `Get_Cal_Date` function included in the `niECal.dll`. Once run, the `CalDate` variable will contain the date when the board was last calibrated.

4. Run the `Calibrate_E_Series` function with the `calOP` variable set to `ND_SELF_CALIBRATE` and the `setOfCalConst` variable set to `ND_USER_EEPROM_AREA`. This step will perform an internal calibration of the board. It may take as long as 30 seconds to complete this function call.
5. Set your calibrator to output a voltage of 7.50 V.
6. Run the `Calibrate_E_Series` function with the `calOP` variable set to `ND_EXTERNAL_CALIBRATE` and the `setOfCalConst` variable set to `ND_USER_EEPROM_AREA`. Set the `calRefVolts` variable to 7.50. If the voltage supplied by your source does not maintain a steady 7.50 V, you will receive an error. If your voltage source is floating with respect to the computer and you have not connected AISENSE to AIGND, you will receive an error.
7. Run the `Copy_Const` function included in the `niECal.dll`. This function enables and copies the new calibration constants to the protected factory portion of the EEPROM. This function will also update the calibration date.
8. Run the `Calibrate_E_Series` function with the `calOP` variable set to `ND_SET_DEFAULT_LOAD_AREA` and the `setOfCalConst` variable set to `ND_FACTORY_EEPROM_AREA`. This step sets the factory-calibration constants as the default constants.
9. Disconnect the calibrator from the board.

The board is now calibrated with respect to your external source.

After the board is calibrated, you may want to verify the analog input and output operation. To do this, repeat the *E Series Verification Procedure* section of this document.

Flowcharts for Creating Verification and Calibration Code

This section shows the basic flowcharts for creating the verification and calibration code the E Series calibration procedure requires. These flowcharts only refer to the appropriate NI-DAQ function calls. You may want to refer to the *Calibration Process* section of this document, to the *NI-DAQ Function Reference Manual for PC Compatibles*, and to the *NI-DAQ User Manual for PC Compatibles* for additional information on the software structure and for function explanations.

Analog Input Verification

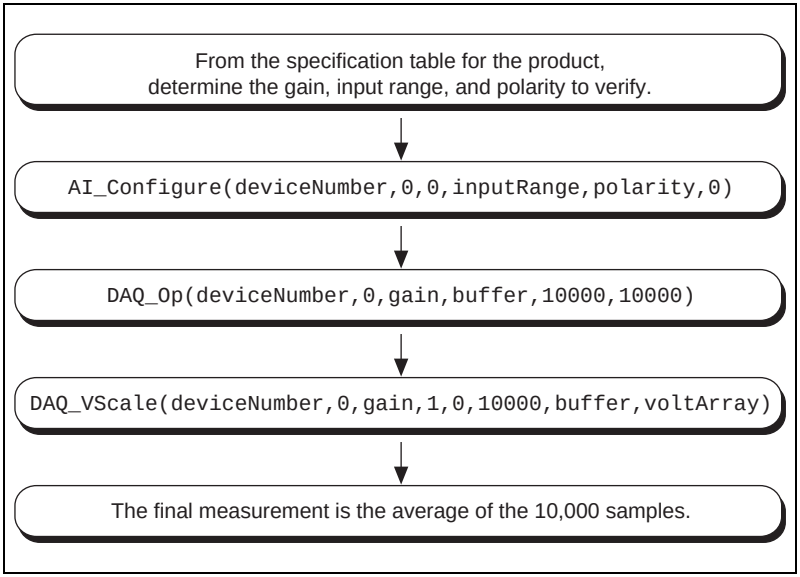

Figure 1. Analog Input Verification

Analog Output Verification

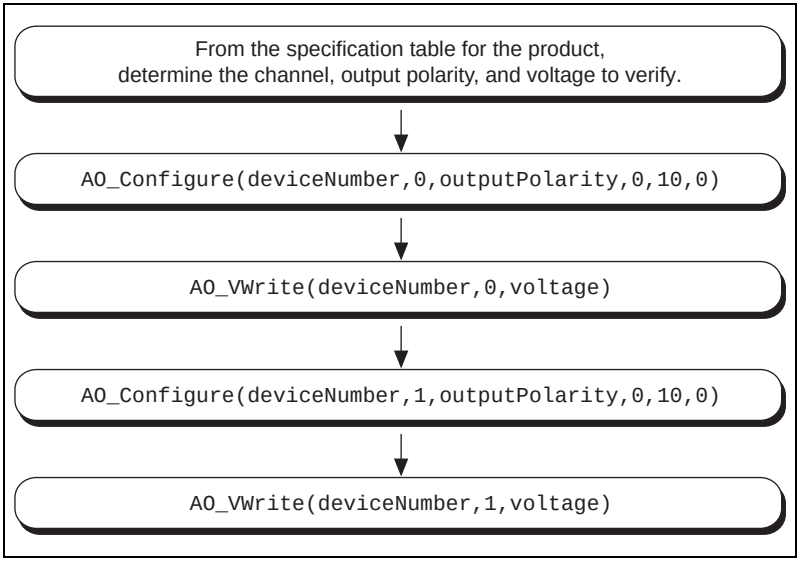

Figure 2. Analog Output Verification

Counter Verification

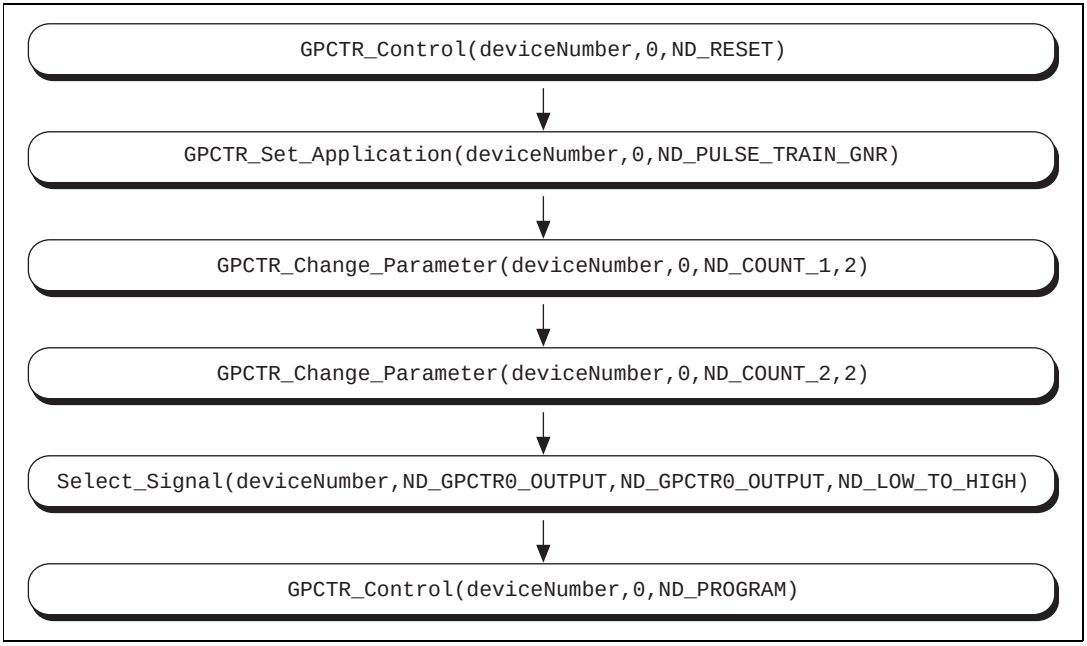

Figure 3. Counter Verification

E Series Calibration

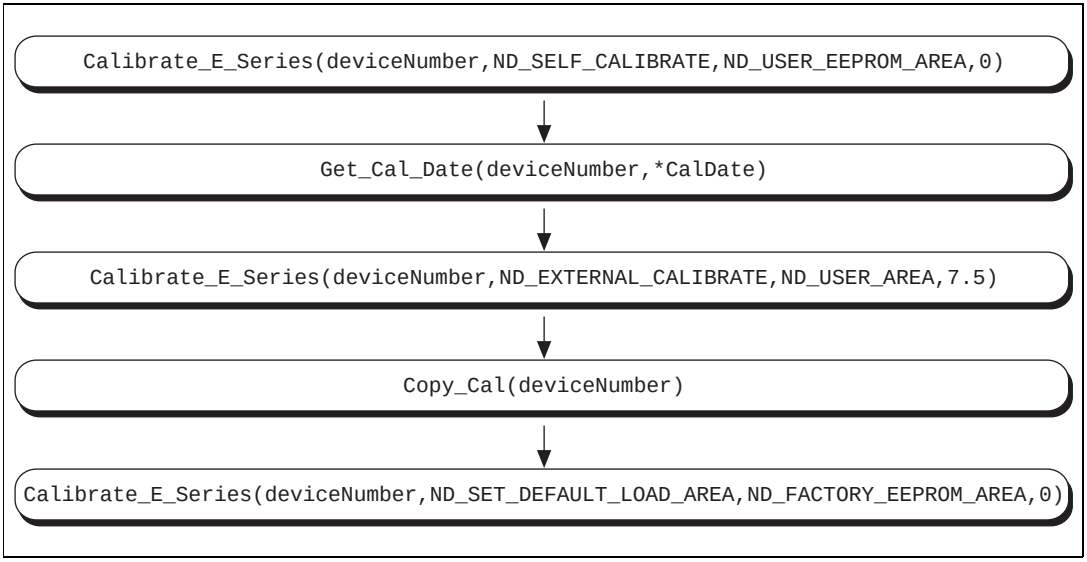

Figure 4. E Series Calibration

Installation and Configuration Issues

Although the operating system automatically detects most E Series products, there are some special cases where manual configuration is required. The following sections detail possible issues that can arise during installation and configuration. As this document may not cover all possible installation issues, you may need to refer to the product user manual for specific installation issues.

AT/PCI/PXI/DAQCard/VXI Devices

These boards are the easiest to configure. Once installed, they are automatically detected by and configured by Windows 98/95. Windows NT detects and configures all boards automatically except for ISA bus Plug and Play devices.

Windows NT

Unlike Windows 98/95, Windows NT 4.0 does not automatically assign resources to ISA bus Plug and Play products. Instead, you must manually choose DMA channels, IRQ levels, and a base I/O range. Windows NT ships with tools that you can use to determine what resources are available. For ISA bus products, you must also be sure to install the ISA Plug and Play driver for Windows NT 4.0, which is provided by Microsoft. You can obtain more information about the installation of the ISA Plug and Play driver by reading the `readme` file in the NI-DAQ directory.

DAQPad Devices

DAQPad devices are supported under Windows 98/95 as well as Windows NT. However, under Windows NT, the addition of the DAQPad driver is somewhat different than under Windows 98/95. The following sections detail the installation of the DAQPad devices.

If your DAQPad device will not pass the resource test in the Measurement & Automation Explorer after using the procedures in the following sections, you may need to modify the parallel port setting in your computer CMOS. Many new computers use a proprietary or ECP setting for the parallel port, which is incompatible with the DAQPad devices. For the DAQPad to communicate with the computer, you must set the parallel port as bidirectional, standard Centronics, or EPP.

Windows 98/95

Because the DAQPad family of E Series devices is not Plug and Play compatible, you must manually add the device to the operating system. Under Windows 98/95, use the Add New Hardware wizard in the

Control Panel. This wizard automatically detects the hardware or allows you to select the hardware to add.

☞ **Note** ***Once you have completed calibrating the DAQPad, you need to manually remove the DAQPad driver from the system. If you do not remove the driver, NI-DAQ tries to install the DAQPad each time you launch the Measurement & Automation Explorer.***

Windows NT 4.0

Under Windows NT 4.0, there is no Add New Hardware wizard. Instead, you must use the Measurement & Automation Explorer to add and maintain all hardware.

☞ **Note** ***Once you have completed calibrating the DAQPad, you need to manually remove the DAQPad driver from the system. If you do not remove the driver, NI-DAQ tries to install the DAQPad each time you launch the Measurement & Automation Explorer.***

E Series Board Specifications

The tables in this section are the specifications for the various E Series products. The specifications are divided into analog input, analog output, and counter/timer tables of values. Some boards do not support analog output, so these specifications may not be valid for certain products.

The tables display the specifications for both 1-year and 24-hour calibration intervals. That is, the 1-year ranges display the specifications that the boards should meet if it has been 1 year between calibrations. Once a board has been calibrated with an external source, the values shown in the 24-hour tables are the valid specifications.

Using the Tables

The following definitions describe how to use the information from the tables in this section.

Range

Range refers to the maximum allowable voltage range of an input or output signal. For example, if a board is configured in bipolar mode with a range of 20 V, the board can sense signals between +10 V and –10 V.

Polarity

Polarity refers to the polarity of the input signal that can be read. In bipolar configuration, the board can read both positive and negative voltages. In unipolar mode, the board can read only positive voltages.

Gain

The *Gain* value is applied to an input voltage prior to sending the voltage to the ADC. The input voltage level, multiplied by the gain, should not exceed the voltage range of the board. For instance, for a gain of 2 with the board configured in bipolar mode, the maximum input voltage can be 4.995 V, because 4.995 * 2.0 = 9.990 V.

Note ***There are no gain settings for analog output, as the analog output gain is fixed at 1.***

Test Point

The *Test Point* is the voltage value that is input or output for verification purposes. This value is broken down into two columns: *Location* and *Value*. *Location* refers to where the test value fits within the test range. *Pos FS* stands for positive full-scale and *Neg FS* stands for negative full-scale. *Value* refers to the voltage value to be verified and is in volts.

24-Hour Ranges

The *24-Hour Range* column contains the *Upper Limits* and *Lower Limits* for the test point value. That is, when the board is within its 24-hour calibration interval, the test point value should fall between the upper and lower limit values. Upper and lower limits are expressed in volts.

1-Year Ranges

The *1-Year Range* column contains the *Upper Limits* and *Lower Limits* for the test point value. That is, when the board is within its 1-year calibration interval, the test point value should fall between the upper and lower limit values. Upper and lower limits are expressed in volts.

Counters

It is not possible to adjust the resolution of the counter/timers. Therefore, these values do not have a 1-year or 24-hour calibration period. However, the test point and upper and lower limits are provided for verification purposes.

AT-AI-16XE-10—16-Bit Resolution

Table 3. Analog Input Values for the AT-AI-16XE-10

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	1	Pos FS	9.9900000	9.9890457	9.9909543	9.9888759	9.9911241
20	bipolar	1	Neg FS	-9.9900000	-9.9909543	-9.9890457	-9.9911241	-9.9888759
20	bipolar	2	Pos FS	4.9950000	4.9932701	4.9967299	4.9931852	4.9968148
20	bipolar	2	Neg FS	-4.9950000	-4.9967299	-4.9932701	-4.9968148	-4.9931852
20	bipolar	5	Pos FS	1.9980000	1.9972877	1.9987123	1.9972537	1.9987463
20	bipolar	5	Neg FS	-1.9980000	-1.9987123	-1.9972877	-1.9987463	-1.9972537
20	bipolar	10	Pos FS	0.9990000	0.9986475	0.9993525	0.9986306	0.9993694
20	bipolar	10	Neg FS	-0.9990000	-0.9993525	-0.9986475	-0.9993694	-0.9986306
20	bipolar	20	Pos FS	0.4995000	0.4993197	0.4996803	0.4993112	0.4996888
20	bipolar	20	Neg FS	-0.4995000	-0.4996803	-0.4993197	-0.4996888	-0.4993112
20	bipolar	50	Pos FS	0.1998000	0.1997214	0.1998786	0.1997180	0.1998820
20	bipolar	50	Neg FS	-0.1998000	-0.1998786	-0.1997214	-0.1998820	-0.1997180
20	bipolar	100	Pos FS	0.0999000	0.0998573	0.0999427	0.0998556	0.0999444
20	bipolar	100	Neg FS	-0.0999000	-0.0999427	-0.0998573	-0.0999444	-0.0998556
10	unipolar	1	Pos FS	9.9900000	9.9892002	9.9907998	9.9890303	9.9909697
10	unipolar	1	Neg FS	0.0100000	0.0096393	0.0103607	0.0096391	0.0103609
10	unipolar	2	Pos FS	4.9950000	4.9933473	4.9966527	4.9932624	4.9967376

Table 3. Analog Input Values for the AT-AI-16XE-10 (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	2	Neg FS	0.0050000	0.0048144	0.0051856	0.0048143	0.0051857
10	unipolar	5	Pos FS	1.9980000	1.9973340	1.9986660	1.9973001	1.9986999
10	unipolar	5	Neg FS	0.0020000	0.0019209	0.0020791	0.0019208	0.0020792
10	unipolar	10	Pos FS	0.9990000	0.9986630	0.9993370	0.9986460	0.9993540
10	unipolar	10	Neg FS	0.0010000	0.0009564	0.0010436	0.0009564	0.0010436
10	unipolar	20	Pos FS	0.4995000	0.4993274	0.4996726	0.4993189	0.4996811
10	unipolar	20	Neg FS	0.0005000	0.0004741	0.0005259	0.0004741	0.0005259
10	unipolar	50	Pos FS	0.1998000	0.1997261	0.1998739	0.1997227	0.1998773
10	unipolar	50	Neg FS	0.0002000	0.0001848	0.0002152	0.0001847	0.0002153
10	unipolar	100	Pos FS	0.0999000	0.0998589	0.0999411	0.0998573	0.0999427
10	unipolar	100	Neg FS	0.0001000	0.0000883	0.0001117	0.0000883	0.0001117

Table 4. Counter Values for the AT-AI-16XE-10

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

AT-MIO-16DE-10—12-Bit Resolution

Table 5. Analog Input Values for the AT-MIO-16DE-10

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	bipolar	0.5	Pos FS	9.9900000	9.9763226	10.0036774	9.9759030	10.0040970
10	bipolar	0.5	Neg FS	-9.9900000	-10.0036774	-9.9763226	-10.0040970	-9.9759030
10	bipolar	1	Pos FS	4.9950000	4.9909006	4.9990994	4.9906908	4.9993092
10	bipolar	1	Neg FS	-4.9950000	-4.9990994	-4.9909006	-4.9993092	-4.9906908
10	bipolar	2	Pos FS	2.4975000	2.4940677	2.5009323	2.4939628	2.5010372
10	bipolar	2	Neg FS	-2.4975000	-2.5009323	-2.4940677	-2.5010372	-2.4939628
10	bipolar	5	Pos FS	0.9990000	0.9976172	1.0003828	0.9975753	1.0004247
10	bipolar	5	Neg FS	-0.9990000	-1.0003828	-0.9976172	-1.0004247	-0.9975753
10	bipolar	10	Pos FS	0.4995000	0.4988002	0.5001998	0.4987792	0.5002208
10	bipolar	10	Neg FS	-0.4995000	-0.5001998	-0.4988002	-0.5002208	-0.4987792
10	bipolar	20	Pos FS	0.2497500	0.2493916	0.2501084	0.2493811	0.2501189
10	bipolar	20	Neg FS	-0.2497500	-0.2501084	-0.2493916	-0.2501189	-0.2493811
10	bipolar	50	Pos FS	0.0999000	0.0997461	0.1000539	0.0997419	0.1000581
10	bipolar	50	Neg FS	-0.0999000	-0.1000539	-0.0997461	-0.1000581	-0.0997419
10	bipolar	100	Pos FS	0.0499500	0.0498645	0.0500355	0.0498624	0.0500376
10	bipolar	100	Neg FS	-0.0499500	-0.0500355	-0.0498645	-0.0500376	-0.0498624
10	unipolar	1	Pos FS	9.9900000	9.9850414	9.9949586	9.9846218	9.9953782

Table 5. Analog Input Values for the AT-MIO-16DE-10 (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	1	Neg FS	0.0100000	0.0067580	0.0132420	0.0067576	0.0132424
10	unipolar	2	Pos FS	4.9950000	4.9897645	5.0002355	4.9895547	5.0004453
10	unipolar	2	Neg FS	0.0050000	0.0033673	0.0066327	0.0033671	0.0066329
10	unipolar	5	Pos FS	1.9980000	1.9958959	2.0001041	1.9958120	2.0001880
10	unipolar	5	Neg FS	0.0020000	0.0013371	0.0026629	0.0013370	0.0026630
10	unipolar	10	Pos FS	0.9990000	0.9979395	1.0000605	0.9978976	1.0001024
10	unipolar	10	Neg FS	0.0010000	0.0006601	0.0013399	0.0006600	0.0013400
10	unipolar	20	Pos FS	0.4995000	0.4989613	0.5000387	0.4989403	0.5000597
10	unipolar	20	Neg FS	0.0005000	0.0003215	0.0006785	0.0003215	0.0006785
10	unipolar	50	Pos FS	0.1998000	0.1995739	0.2000261	0.1995656	0.2000344
10	unipolar	50	Neg FS	0.0002000	0.0001181	0.0002819	0.0001180	0.0002820
10	unipolar	100	Pos FS	0.0999000	0.0997785	0.1000215	0.0997743	0.1000257
10	unipolar	100	Neg FS	0.0001000	0.0000505	0.0001495	0.0000505	0.0001495

Table 6. Analog Output Values for the AT-MIO-16DE-10

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9822988	9.9977012	9.9818792	9.9981208
20	bipolar	Neg FS	-9.9900000	-9.9977012	-9.9822988	-9.9981208	-9.9818792
10	unipolar	Pos FS	9.9900000	9.9847408	9.9952592	9.9843212	9.9956788
10	unipolar	Neg FS	0.0100000	0.0065072	0.0134928	0.0065068	0.0134932

Table 7. Counter Values for the AT-MIO-16DE-10

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

AT-MIO-16E-1—12-Bit Resolution

Table 8. Analog Input Values for the AT-MIO-16E-1

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	bipolar	0.5	Pos FS	9.9900000	9.9783206	10.0016794	9.9779010	10.0020990
10	bipolar	0.5	Neg FS	-9.9900000	-10.0016794	-9.9783206	-10.0020990	-9.9779010
10	bipolar	1	Pos FS	4.9950000	4.9904011	4.9995989	4.9901913	4.9998087
10	bipolar	1	Neg FS	-4.9950000	-4.9995989	-4.9904011	-4.9998087	-4.9901913
10	bipolar	2	Pos FS	2.4975000	2.4945672	2.5004328	2.4944623	2.5005377
10	bipolar	2	Neg FS	-2.4975000	-2.5004328	-2.4945672	-2.5005377	-2.4944623
10	bipolar	5	Pos FS	0.9990000	0.9978170	1.0001830	0.9977751	1.0002249
10	bipolar	5	Neg FS	-0.9990000	-1.0001830	-0.9978170	-1.0002249	-0.9977751
10	bipolar	10	Pos FS	0.4995000	0.4989001	0.5000999	0.4988791	0.5001209
10	bipolar	10	Neg FS	-0.4995000	-0.5000999	-0.4989001	-0.5001209	-0.4988791
10	bipolar	20	Pos FS	0.2497500	0.2494412	0.2500588	0.2494307	0.2500693
10	bipolar	20	Neg FS	-0.2497500	-0.2500588	-0.2494412	-0.2500693	-0.2494307
10	bipolar	50	Pos FS	0.0999000	0.0997658	0.1000342	0.0997616	0.1000384
10	bipolar	50	Neg FS	-0.0999000	-0.1000342	-0.0997658	-0.1000384	-0.0997616
10	bipolar	100	Pos FS	0.0499500	0.0498742	0.0500258	0.0498721	0.0500279
10	bipolar	100	Neg FS	-0.0499500	-0.0500258	-0.0498742	-0.0500279	-0.0498721
10	unipolar	1	Pos FS	9.9900000	9.9840424	9.9959576	9.9836228	9.9963772

Table 8. Analog Input Values for the AT-MIO-16E-1 (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	1	Neg FS	0.0100000	0.0067570	0.0132430	0.0067566	0.0132434
10	unipolar	2	Pos FS	4.9950000	4.9907635	4.9992365	4.9905537	4.9994463
10	unipolar	2	Neg FS	0.0050000	0.0033683	0.0066317	0.0033681	0.0066319
10	unipolar	5	Pos FS	1.9980000	1.9962955	1.9997045	1.9962116	1.9997884
10	unipolar	5	Neg FS	0.0020000	0.0013375	0.0026625	0.0013374	0.0026626
10	unipolar	10	Pos FS	0.9990000	0.9981393	0.9998607	0.9980974	0.9999026
10	unipolar	10	Neg FS	0.0010000	0.0006603	0.0013397	0.0006602	0.0013398
10	unipolar	20	Pos FS	0.4995000	0.4990609	0.4999391	0.4990399	0.4999601
10	unipolar	20	Neg FS	0.0005000	0.0003213	0.0006787	0.0003213	0.0006787
10	unipolar	50	Pos FS	0.1998000	0.1996136	0.1999864	0.1996052	0.1999948
10	unipolar	50	Neg FS	0.0002000	0.0001178	0.0002822	0.0001178	0.0002822
10	unipolar	100	Pos FS	0.0999000	0.0997982	0.1000018	0.0997940	0.1000060
10	unipolar	100	Neg FS	0.0001000	0.0000502	0.0001498	0.0000502	0.0001498

Table 9. Analog Output Values for the AT-MIO-16E-1

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9822988	9.9977012	9.9818792	9.9981208
20	bipolar	Neg FS	-9.9900000	-9.9977012	-9.9822988	-9.9981208	-9.9818792
10	unipolar	Pos FS	9.9900000	9.9847408	9.9952592	9.9843212	9.9956788
10	unipolar	Neg FS	0.0100000	0.0065072	0.0134928	0.0065068	0.0134932

Table 10. Counter Values for the AT-MIO-16E-1

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

AT-MIO-16E-10—12-Bit Resolution

Table 11. Analog Input Values for the AT-MIO-16E-10

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	bipolar	0.5	Pos FS	9.9900000	9.9763226	10.0036774	9.9759030	10.0040970
10	bipolar	0.5	Neg FS	-9.9900000	-10.0036774	-9.9763226	-10.0040970	-9.9759030
10	bipolar	1	Pos FS	4.9950000	4.9909006	4.9990994	4.9906908	4.9993092
10	bipolar	1	Neg FS	-4.9950000	-4.9990994	-4.9909006	-4.9993092	-4.9906908
10	bipolar	2	Pos FS	2.4975000	2.4940677	2.5009323	2.4939628	2.5010372
10	bipolar	2	Neg FS	-2.4975000	-2.5009323	-2.4940677	-2.5010372	-2.4939628
10	bipolar	5	Pos FS	0.9990000	0.9976172	1.0003828	0.9975753	1.0004247
10	bipolar	5	Neg FS	-0.9990000	-1.0003828	-0.9976172	-1.0004247	-0.9975753
10	bipolar	10	Pos FS	0.4995000	0.4988002	0.5001998	0.4987792	0.5002208
10	bipolar	10	Neg FS	-0.4995000	-0.5001998	-0.4988002	-0.5002208	-0.4987792
10	bipolar	20	Pos FS	0.2497500	0.2493916	0.2501084	0.2493811	0.2501189
10	bipolar	20	Neg FS	-0.2497500	-0.2501084	-0.2493916	-0.2501189	-0.2493811
10	bipolar	50	Pos FS	0.0999000	0.0997461	0.1000539	0.0997419	0.1000581
10	bipolar	50	Neg FS	-0.0999000	-0.1000539	-0.0997461	-0.1000581	-0.0997419
10	bipolar	100	Pos FS	0.0499500	0.0498645	0.0500355	0.0498624	0.0500376
10	bipolar	100	Neg FS	-0.0499500	-0.0500355	-0.0498645	-0.0500376	-0.0498624
10	unipolar	1	Pos FS	9.9900000	9.9850414	9.9949586	9.9846218	9.9953782

Table 11. Analog Input Values for the AT-MIO-16E-10 (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	1	Neg FS	0.0100000	0.0067580	0.0132420	0.0067576	0.0132424
10	unipolar	2	Pos FS	4.9950000	4.9897645	5.0002355	4.9895547	5.0004453
10	unipolar	2	Neg FS	0.0050000	0.0033673	0.0066327	0.0033671	0.0066329
10	unipolar	5	Pos FS	1.9980000	1.9958959	2.0001041	1.9958120	2.0001880
10	unipolar	5	Neg FS	0.0020000	0.0013371	0.0026629	0.0013370	0.0026630
10	unipolar	10	Pos FS	0.9990000	0.9979395	1.0000605	0.9978976	1.0001024
10	unipolar	10	Neg FS	0.0010000	0.0006601	0.0013399	0.0006600	0.0013400
10	unipolar	20	Pos FS	0.4995000	0.4989613	0.5000387	0.4989403	0.5000597
10	unipolar	20	Neg FS	0.0005000	0.0003215	0.0006785	0.0003215	0.0006785
10	unipolar	50	Pos FS	0.1998000	0.1995739	0.2000261	0.1995656	0.2000344
10	unipolar	50	Neg FS	0.0002000	0.0001181	0.0002819	0.0001180	0.0002820
10	unipolar	100	Pos FS	0.0999000	0.0997785	0.1000215	0.0997743	0.1000257
10	unipolar	100	Neg FS	0.0001000	0.0000505	0.0001495	0.0000505	0.0001495

Table 12. Analog Output Values for the AT-MIO-16E-10

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9822988	9.9977012	9.9818792	9.9981208
20	bipolar	Neg FS	-9.9900000	-9.9977012	-9.9822988	-9.9981208	-9.9818792
10	unipolar	Pos FS	9.9900000	9.9847408	9.9952592	9.9843212	9.9956788
10	unipolar	Neg FS	0.0100000	0.0065072	0.0134928	0.0065068	0.0134932

Table 13. Counter Values for the AT-MIO-16E-10

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

AT-MIO-16E-2—12-Bit Resolution

Table 14. Analog Input Values for the AT-MIO-16E-2

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	bipolar	0.5	Pos FS	9.9900000	9.9783206	10.0016794	9.9779010	10.0020990
10	bipolar	0.5	Neg FS	-9.9900000	-10.0016794	-9.9783206	-10.0020990	-9.9779010
10	bipolar	1	Pos FS	4.9950000	4.9904011	4.9995989	4.9901913	4.9998087
10	bipolar	1	Neg FS	-4.9950000	-4.9995989	-4.9904011	-4.9998087	-4.9901913
10	bipolar	2	Pos FS	2.4975000	2.4945672	2.5004328	2.4944623	2.5005377
10	bipolar	2	Neg FS	-2.4975000	-2.5004328	-2.4945672	-2.5005377	-2.4944623
10	bipolar	5	Pos FS	0.9990000	0.9978170	1.0001830	0.9977751	1.0002249
10	bipolar	5	Neg FS	-0.9990000	-1.0001830	-0.9978170	-1.0002249	-0.9977751
10	bipolar	10	Pos FS	0.4995000	0.4989001	0.5000999	0.4988791	0.5001209
10	bipolar	10	Neg FS	-0.4995000	-0.5000999	-0.4989001	-0.5001209	-0.4988791
10	bipolar	20	Pos FS	0.2497500	0.2494415	0.2500585	0.2494310	0.2500690
10	bipolar	20	Neg FS	-0.2497500	-0.2500585	-0.2494415	-0.2500690	-0.2494310
10	bipolar	50	Pos FS	0.0999000	0.0997659	0.1000341	0.0997617	0.1000383
10	bipolar	50	Neg FS	-0.0999000	-0.1000341	-0.0997659	-0.1000383	-0.0997617
10	bipolar	100	Pos FS	0.0499500	0.0498743	0.0500257	0.0498722	0.0500278
10	bipolar	100	Neg FS	-0.0499500	-0.0500257	-0.0498743	-0.0500278	-0.0498722
10	unipolar	1	Pos FS	9.9900000	9.9840424	9.9959576	9.9836228	9.9963772

Table 14. Analog Input Values for the AT-MIO-16E-2 (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	1	Neg FS	0.0100000	0.0067570	0.0132430	0.0067566	0.0132434
10	unipolar	2	Pos FS	4.9950000	4.9907635	4.9992365	4.9905537	4.9994463
10	unipolar	2	Neg FS	0.0050000	0.0033683	0.0066317	0.0033681	0.0066319
10	unipolar	5	Pos FS	1.9980000	1.9962955	1.9997045	1.9962116	1.9997884
10	unipolar	5	Neg FS	0.0020000	0.0013375	0.0026625	0.0013374	0.0026626
10	unipolar	10	Pos FS	0.9990000	0.9981393	0.9998607	0.9980974	0.9999026
10	unipolar	10	Neg FS	0.0010000	0.0006603	0.0013397	0.0006602	0.0013398
10	unipolar	20	Pos FS	0.4995000	0.4990612	0.4999388	0.4990402	0.4999598
10	unipolar	20	Neg FS	0.0005000	0.0003216	0.0006784	0.0003216	0.0006784
10	unipolar	50	Pos FS	0.1998000	0.1996137	0.1999863	0.1996053	0.1999947
10	unipolar	50	Neg FS	0.0002000	0.0001179	0.0002821	0.0001179	0.0002821
10	unipolar	100	Pos FS	0.0999000	0.0997983	0.1000017	0.0997941	0.1000059
10	unipolar	100	Neg FS	0.0001000	0.0000503	0.0001497	0.0000503	0.0001497

Table 15. Analog Output Values for the AT-MIO-16E-2

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9822988	9.9977012	9.9818792	9.9981208
20	bipolar	Neg FS	-9.9900000	-9.9977012	-9.9822988	-9.9981208	-9.9818792
10	unipolar	Pos FS	9.9900000	9.9847408	9.9952592	9.9843212	9.9956788
10	unipolar	Neg FS	0.0100000	0.0065072	0.0134928	0.0065068	0.0134932

Table 16. Counter Values for the AT-MIO-16E-2

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

AT-MIO-16XE-10—16-Bit Resolution

Table 17. Analog Input Values for the AT-MIO-16XE-10

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	1	Pos FS	9.9900000	9.9890457	9.9909543	9.9888759	9.9911241
20	bipolar	1	Neg FS	-9.9900000	-9.9909543	-9.9890457	-9.9911241	-9.9888759
20	bipolar	2	Pos FS	4.9950000	4.9932701	4.9967299	4.9931852	4.9968148
20	bipolar	2	Neg FS	-4.9950000	-4.9967299	-4.9932701	-4.9968148	-4.9931852
20	bipolar	5	Pos FS	1.9980000	1.9972877	1.9987123	1.9972537	1.9987463
20	bipolar	5	Neg FS	-1.9980000	-1.9987123	-1.9972877	-1.9987463	-1.9972537
20	bipolar	10	Pos FS	0.9990000	0.9986475	0.9993525	0.9986306	0.9993694
20	bipolar	10	Neg FS	-0.9990000	-0.9993525	-0.9986475	-0.9993694	-0.9986306
20	bipolar	20	Pos FS	0.4995000	0.4993197	0.4996803	0.4993112	0.4996888
20	bipolar	20	Neg FS	-0.4995000	-0.4996803	-0.4993197	-0.4996888	-0.4993112
20	bipolar	50	Pos FS	0.1998000	0.1997214	0.1998786	0.1997180	0.1998820
20	bipolar	50	Neg FS	-0.1998000	-0.1998786	-0.1997214	-0.1998820	-0.1997180
20	bipolar	100	Pos FS	0.0999000	0.0998573	0.0999427	0.0998556	0.0999444
20	bipolar	100	Neg FS	-0.0999000	-0.0999427	-0.0998573	-0.0999444	-0.0998556
10	unipolar	1	Pos FS	9.9900000	9.9892002	9.9907998	9.9890303	9.9909697
10	unipolar	1	Neg FS	0.0100000	0.0096393	0.0103607	0.0096391	0.0103609
10	unipolar	2	Pos FS	4.9950000	4.9933473	4.9966527	4.9932624	4.9967376

Table 17. Analog Input Values for the AT-MIO-16XE-10 (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	2	Neg FS	0.0050000	0.0048144	0.0051856	0.0048143	0.0051857
10	unipolar	5	Pos FS	1.9980000	1.9973340	1.9986660	1.9973001	1.9986999
10	unipolar	5	Neg FS	0.0020000	0.0019209	0.0020791	0.0019208	0.0020792
10	unipolar	10	Pos FS	0.9990000	0.9986630	0.9993370	0.9986460	0.9993540
10	unipolar	10	Neg FS	0.0010000	0.0009564	0.0010436	0.0009564	0.0010436
10	unipolar	20	Pos FS	0.4995000	0.4993274	0.4996726	0.4993189	0.4996811
10	unipolar	20	Neg FS	0.0005000	0.0004741	0.0005259	0.0004741	0.0005259
10	unipolar	50	Pos FS	0.1998000	0.1997261	0.1998739	0.1997227	0.1998773
10	unipolar	50	Neg FS	0.0002000	0.0001848	0.0002152	0.0001847	0.0002153
10	unipolar	100	Pos FS	0.0999000	0.0998589	0.0999411	0.0998573	0.0999427
10	unipolar	100	Neg FS	0.0001000	0.0000883	0.0001117	0.0000883	0.0001117

Table 18. Analog Output Values for the AT-MIO-16XE-10

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9887375	9.9912626	9.9885676	9.9914324
20	bipolar	Neg FS	-9.9900000	-9.9912626	-9.9887375	-9.9914324	-9.9885676
10	unipolar	Pos FS	9.9900000	9.9889665	9.9910336	9.9887966	9.9912034
10	unipolar	Neg FS	0.0100000	0.0094156	0.0105845	0.0094154	0.0105846

Table 19. Counter Values for the AT-MIO-16XE-10

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

AT-MIO-16XE-50—16-Bit Resolution

Table 20. Analog Input Values for the AT-MIO-16XE-50

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	1	Pos FS	9.9900000	9.9890188	9.9909812	9.9885992	9.9914008
20	bipolar	1	Neg FS	-9.9900000	-9.9909812	-9.9890188	-9.9914008	-9.9885992
20	bipolar	2	Pos FS	4.9950000	4.9937582	4.9962419	4.9935484	4.9964516
20	bipolar	2	Neg FS	-4.9950000	-4.9962419	-4.9937582	-4.9964516	-4.9935484
20	bipolar	10	Pos FS	0.9990000	0.9987483	0.9992517	0.9987064	0.9992936
20	bipolar	10	Neg FS	-0.9990000	-0.9992517	-0.9987483	-0.9992936	-0.9987064
20	bipolar	100	Pos FS	0.0999000	0.0998512	0.0999488	0.0998470	0.0999530
20	bipolar	100	Neg FS	-0.0999000	-0.0999488	-0.0998512	-0.0999530	-0.0998470
10	unipolar	1	Pos FS	9.9900000	9.9891737	9.9908263	9.9887541	9.9912459
10	unipolar	1	Neg FS	0.0100000	0.0097525	0.0102475	0.0097521	0.0102479
10	unipolar	2	Pos FS	4.9950000	4.9933361	4.9966639	4.9931263	4.9968737
10	unipolar	2	Neg FS	0.0050000	0.0048730	0.0051270	0.0048728	0.0051272
10	unipolar	10	Pos FS	0.9990000	0.9986640	0.9993360	0.9986220	0.9993780
10	unipolar	10	Neg FS	0.0010000	0.0009714	0.0010286	0.0009713	0.0010287
10	unipolar	100	Pos FS	0.0999000	0.0998527	0.0999473	0.0998485	0.0999515
10	unipolar	100	Neg FS	0.0001000	0.0000934	0.0001066	0.0000934	0.0001066

Table 21. Analog Output Values for the AT-MIO-16XE-50

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9832234	9.9967766	9.9828038	9.9971962
20	bipolar	Neg FS	-9.9900000	-9.9967766	-9.9832234	-9.9971962	-9.9828038

Table 22. Counter Values for the AT-MIO-16XE-50

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

AT-MIO-64E-3—12-Bit Resolution

Table 23. Analog Input Values for the AT-MIO-64E-3

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	bipolar	0.5	Pos FS	9.9900000	9.9783206	10.0016794	9.9779010	10.0020990
10	bipolar	0.5	Neg FS	-9.9900000	-10.0016794	-9.9783206	-10.0020990	-9.9779010
10	bipolar	1	Pos FS	4.9950000	4.9904011	4.9995989	4.9901913	4.9998087
10	bipolar	1	Neg FS	-4.9950000	-4.9995989	-4.9904011	-4.9998087	-4.9901913
10	bipolar	2	Pos FS	2.4975000	2.4945672	2.5004328	2.4944623	2.5005377
10	bipolar	2	Neg FS	-2.4975000	-2.5004328	-2.4945672	-2.5005377	-2.4944623
10	bipolar	5	Pos FS	0.9990000	0.9978170	1.0001830	0.9977751	1.0002249
10	bipolar	5	Neg FS	-0.9990000	-1.0001830	-0.9978170	-1.0002249	-0.9977751
10	bipolar	10	Pos FS	0.4995000	0.4989001	0.5000999	0.4988791	0.5001209
10	bipolar	10	Neg FS	-0.4995000	-0.5000999	-0.4989001	-0.5001209	-0.4988791
10	bipolar	20	Pos FS	0.2497500	0.2494415	0.2500585	0.2494310	0.2500690
10	bipolar	20	Neg FS	-0.2497500	-0.2500585	-0.2494415	-0.2500690	-0.2494310
10	bipolar	50	Pos FS	0.0999000	0.0997659	0.1000341	0.0997617	0.1000383
10	bipolar	50	Neg FS	-0.0999000	-0.1000341	-0.0997659	-0.1000383	-0.0997617
10	bipolar	100	Pos FS	0.0499500	0.0498743	0.0500257	0.0498722	0.0500278
10	bipolar	100	Neg FS	-0.0499500	-0.0500257	-0.0498743	-0.0500278	-0.0498722
10	unipolar	1	Pos FS	9.9900000	9.9840424	9.9959576	9.9836228	9.9963772

Table 23. Analog Input Values for the AT-MIO-64E-3 (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	1	Neg FS	0.0100000	0.0067570	0.0132430	0.0067566	0.0132434
10	unipolar	2	Pos FS	4.9950000	4.9907635	4.9992365	4.9905537	4.9994463
10	unipolar	2	Neg FS	0.0050000	0.0033683	0.0066317	0.0033681	0.0066319
10	unipolar	5	Pos FS	1.9980000	1.9962955	1.9997045	1.9962116	1.9997884
10	unipolar	5	Neg FS	0.0020000	0.0013375	0.0026625	0.0013374	0.0026626
10	unipolar	10	Pos FS	0.9990000	0.9981393	0.9998607	0.9980974	0.9999026
10	unipolar	10	Neg FS	0.0010000	0.0006603	0.0013397	0.0006602	0.0013398
10	unipolar	20	Pos FS	0.4995000	0.4990612	0.4999388	0.4990402	0.4999598
10	unipolar	20	Neg FS	0.0005000	0.0003216	0.0006784	0.0003216	0.0006784
10	unipolar	50	Pos FS	0.1998000	0.1996137	0.1999863	0.1996053	0.1999947
10	unipolar	50	Neg FS	0.0002000	0.0001179	0.0002821	0.0001179	0.0002821
10	unipolar	100	Pos FS	0.0999000	0.0997983	0.1000017	0.0997941	0.1000059
10	unipolar	100	Neg FS	0.0001000	0.0000503	0.0001497	0.0000503	0.0001497

Table 24. Analog Output Values for the AT-MIO-64E-3

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9822988	9.9977012	9.9818792	9.9981208
20	bipolar	Neg FS	-9.9900000	-9.9977012	-9.9822988	-9.9981208	-9.9818792
10	unipolar	Pos FS	9.9900000	9.9847408	9.9952592	9.9843212	9.9956788
10	unipolar	Neg FS	0.0100000	0.0065072	0.0134928	0.0065068	0.0134932

Table 25. Counter Values for the AT-MIO-64E-3

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

DAQCard-AI-16E-4—12-Bit Resolution

Table 26. Analog Input Values for the DAQCard-AI-16E-4

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	bipolar	0.5	Pos FS	9.9900000	9.9772120	10.0027880	9.9767925	10.0032075
10	bipolar	0.5	Neg FS	-9.9900000	-10.0027880	-9.9772120	-10.0032075	-9.9767925
10	bipolar	1	Pos FS	4.9950000	4.9898448	5.0001552	4.9896350	5.0003650
10	bipolar	1	Neg FS	-4.9950000	-5.0001552	-4.9898448	-5.0003650	-4.9896350
10	bipolar	2	Pos FS	2.4975000	2.4942871	2.5007129	2.4941822	2.5008178
10	bipolar	2	Neg FS	-2.4975000	-2.5007129	-2.4942871	-2.5008178	-2.4941822
10	bipolar	5	Pos FS	0.9990000	0.9977025	1.0002975	0.9976606	1.0003394
10	bipolar	5	Neg FS	-0.9990000	-1.0071105	-0.9908895	-1.0071524	-0.9908476
10	bipolar	10	Pos FS	0.4995000	0.4988409	0.5001591	0.4988199	0.5001801
10	bipolar	10	Neg FS	-0.4995000	-0.5001591	-0.4988409	-0.5001801	-0.4988199
10	bipolar	20	Pos FS	0.2497500	0.2494099	0.2500901	0.2493994	0.2501006
10	bipolar	20	Neg FS	-0.2497500	-0.2500901	-0.2494099	-0.2501006	-0.2493994
10	bipolar	50	Pos FS	0.0999000	0.0997504	0.1000496	0.0997462	0.1000538
10	bipolar	50	Neg FS	-0.0999000	-0.1000496	-0.0997504	-0.1000538	-0.0997462
10	bipolar	100	Pos FS	0.0499500	0.0498641	0.0500359	0.0498620	0.0500380
10	bipolar	100	Neg FS	-0.0499500	-0.0500359	-0.0498641	-0.0500380	-0.0498620
10	unipolar	1	Pos FS	9.9900000	9.9834861	9.9965139	9.9830666	9.9969334

Table 26. Analog Input Values for the DAQCard-AI-16E-4 (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	1	Neg FS	0.0100000	0.0062007	0.0137993	0.0062003	0.0137997
10	unipolar	2	Pos FS	4.9950000	4.9904834	4.9995166	4.9902736	4.9997264
10	unipolar	2	Neg FS	0.0050000	0.0030882	0.0069118	0.0030880	0.0069120
10	unipolar	5	Pos FS	1.9980000	1.9961810	1.9998190	1.9960971	1.9999029
10	unipolar	5	Neg FS	0.0020000	-0.0055901	0.0095901	-0.0055901	0.0095901
10	unipolar	10	Pos FS	0.9990000	0.9980801	0.9999199	0.9980382	0.9999618
10	unipolar	10	Neg FS	0.0010000	0.0006011	0.0013989	0.0006010	0.0013990
10	unipolar	20	Pos FS	0.4995000	0.4990296	0.4999704	0.4990086	0.4999914
10	unipolar	20	Neg FS	0.0005000	0.0002900	0.0007100	0.0002900	0.0007100
10	unipolar	50	Pos FS	0.1998000	0.1995982	0.2000018	0.1995899	0.2000101
10	unipolar	50	Neg FS	0.0002000	0.0001024	0.0002976	0.0001024	0.0002976
10	unipolar	100	Pos FS	0.0999000	0.0997881	0.1000119	0.0997839	0.1000161
10	unipolar	100	Neg FS	0.0001000	0.0000402	0.0001598	0.0000402	0.0001598

Table 27. Counter Values for the DAQCard-AI-16E-4

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

DAQCard-16XE-50—16-Bit Resolution

Table 28. Analog Input Values for the DAQCard-16XE-50

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	1	Pos FS	9.9900000	9.9884262	9.9915738	9.9880066	9.9919934
20	bipolar	1	Neg FS	-9.9900000	-9.9915738	-9.9884262	-9.9919934	-9.9880066
20	bipolar	2	Pos FS	4.9950000	4.9934618	4.9965382	4.9932521	4.9967479
20	bipolar	2	Neg FS	-4.9950000	-4.9965382	-4.9934618	-4.9967479	-4.9932521
20	bipolar	10	Pos FS	0.9990000	0.9986891	0.9993109	0.9986471	0.9993529
20	bipolar	10	Neg FS	-0.9990000	-0.9993109	-0.9986891	-0.9993529	-0.9986471
20	bipolar	100	Pos FS	0.0999000	0.0998452	0.0999548	0.0998410	0.0999590
20	bipolar	100	Neg FS	-0.0999000	-0.0999548	-0.0998452	-0.0999590	-0.0998410
10	unipolar	1	Pos FS	9.9900000	9.9886550	9.9913450	9.9882354	9.9917646
10	unipolar	1	Neg FS	0.0100000	0.0094035	0.0105965	0.0094031	0.0105970
10	unipolar	2	Pos FS	4.9950000	4.9935762	4.9964238	4.9933664	4.9966336
10	unipolar	2	Neg FS	0.0050000	0.0046990	0.0053010	0.0046988	0.0053012
10	unipolar	10	Pos FS	0.9990000	0.9987120	0.9992880	0.9986700	0.9993300
10	unipolar	10	Neg FS	0.0010000	0.0009365	0.0010635	0.0009365	0.0010635
10	unipolar	100	Pos FS	0.0999000	0.0998476	0.0999524	0.0998434	0.0999566
10	unipolar	100	Neg FS	0.0001000	0.0000900	0.0001100	0.0000900	0.0001100

Table 29. Counter Values for the DAQCard-16XE-50

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

DAQPad-MIO-16XE-50—16-Bit Resolution

Table 30. Analog Input Values for the DAQPad-MIO-16XE-50

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	1	Pos FS	9.9900000	9.9890188	9.9909812	9.9885992	9.9914008
20	bipolar	1	Neg FS	-9.9900000	-9.9909812	-9.9890188	-9.9914008	-9.9885992
20	bipolar	2	Pos FS	4.9950000	4.9937582	4.9962419	4.9935484	4.9964516
20	bipolar	2	Neg FS	-4.9950000	-4.9962419	-4.9937582	-4.9964516	-4.9935484
20	bipolar	10	Pos FS	0.9990000	0.9987483	0.9992517	0.9987064	0.9992936
20	bipolar	10	Neg FS	-0.9990000	-0.9992517	-0.9987483	-0.9992936	-0.9987064
20	bipolar	100	Pos FS	0.0999000	0.0998512	0.0999488	0.0998470	0.0999530
20	bipolar	100	Neg FS	-0.0999000	-0.0999488	-0.0998512	-0.0999530	-0.0998470
10	unipolar	1	Pos FS	9.9900000	9.9891737	9.9908263	9.9887541	9.9912459
10	unipolar	1	Neg FS	0.0100000	0.0097525	0.0102475	0.0097521	0.0102479
10	unipolar	2	Pos FS	4.9950000	4.9938356	4.9961644	4.9931263	4.9968737
10	unipolar	2	Neg FS	0.0050000	0.0048735	0.0051265	0.0048728	0.0051272
10	unipolar	10	Pos FS	0.9990000	0.9987639	0.9992361	0.9986220	0.9993780
10	unipolar	10	Neg FS	0.0010000	0.0009715	0.0010285	0.0009713	0.0010287
10	unipolar	100	Pos FS	0.0999000	0.0998527	0.0999473	0.0998485	0.0999515
10	unipolar	100	Neg FS	0.0001000	0.0000934	0.0001066	0.0000934	0.0001066

Table 31. Analog Output Values for the DAQPad-MIO-16XE-50

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9832234	9.9967766	9.9828038	9.9971962
20	bipolar	Neg FS	-9.9900000	-9.9967766	-9.9832234	-9.9971962	-9.9828038

Table 32. Counter Values for the DAQPad-MIO-16XE-50

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

PCI-6031E—16-Bit Resolution

Table 33. Analog Input Values for the PCI-6031E

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	1	Pos FS	9.9900000	9.9890457	9.9909543	9.9888759	9.9911241
20	bipolar	1	Neg FS	-9.9900000	-9.9909543	-9.9890457	-9.9911241	-9.9888759
20	bipolar	2	Pos FS	4.9950000	4.9932701	4.9967299	4.9931852	4.9968148
20	bipolar	2	Neg FS	-4.9950000	-4.9967299	-4.9932701	-4.9968148	-4.9931852
20	bipolar	5	Pos FS	1.9980000	1.9972877	1.9987123	1.9972537	1.9987463
20	bipolar	5	Neg FS	-1.9980000	-1.9987123	-1.9972877	-1.9987463	-1.9972537
20	bipolar	10	Pos FS	0.9990000	0.9986475	0.9993525	0.9986306	0.9993694
20	bipolar	10	Neg FS	-0.9990000	-0.9993525	-0.9986475	-0.9993694	-0.9986306
20	bipolar	20	Pos FS	0.4995000	0.4993197	0.4996803	0.4993112	0.4996888
20	bipolar	20	Neg FS	-0.4995000	-0.4996803	-0.4993197	-0.4996888	-0.4993112
20	bipolar	50	Pos FS	0.1998000	0.1997214	0.1998786	0.1997180	0.1998820
20	bipolar	50	Neg FS	-0.1998000	-0.1998786	-0.1997214	-0.1998820	-0.1997180
20	bipolar	100	Pos FS	0.0999000	0.0998573	0.0999427	0.0998556	0.0999444
20	bipolar	100	Neg FS	-0.0999000	-0.0999427	-0.0998573	-0.0999444	-0.0998556
10	unipolar	1	Pos FS	9.9900000	9.9892002	9.9907998	9.9890303	9.9909697
10	unipolar	1	Neg FS	0.0100000	0.0096393	0.0103607	0.0096391	0.0103609
10	unipolar	2	Pos FS	4.9950000	4.9933473	4.9966527	4.9932624	4.9967376

Table 33. Analog Input Values for the PCI-6031E (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	2	Neg FS	0.0050000	0.0048144	0.0051856	0.0048143	0.0051857
10	unipolar	5	Pos FS	1.9980000	1.9973340	1.9986660	1.9973001	1.9986999
10	unipolar	5	Neg FS	0.0020000	0.0019209	0.0020791	0.0019208	0.0020792
10	unipolar	10	Pos FS	0.9990000	0.9986630	0.9993370	0.9986460	0.9993540
10	unipolar	10	Neg FS	0.0010000	0.0009564	0.0010436	0.0009564	0.0010436
10	unipolar	20	Pos FS	0.4995000	0.4993274	0.4996726	0.4993189	0.4996811
10	unipolar	20	Neg FS	0.0005000	0.0004741	0.0005259	0.0004741	0.0005259
10	unipolar	50	Pos FS	0.1998000	0.1997261	0.1998739	0.1997227	0.1998773
10	unipolar	50	Neg FS	0.0002000	0.0001848	0.0002152	0.0001847	0.0002153
10	unipolar	100	Pos FS	0.0999000	0.0998589	0.0999411	0.0998573	0.0999427
10	unipolar	100	Neg FS	0.0001000	0.0000883	0.0001117	0.0000883	0.0001117

Table 34. Analog Output Values for the PCI-6031E

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9887375	9.9912626	9.9885676	9.9914324
20	bipolar	Neg FS	-9.9900000	-9.9912626	-9.9887375	-9.9914324	-9.9885676
10	unipolar	Pos FS	9.9900000	9.9889665	9.9910336	9.9887966	9.9912034
10	unipolar	Neg FS	0.0100000	0.0094156	0.0105845	0.0094154	0.0105846

Table 35. Counter Values for the PCI-6031E

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

PCI-6032E—16-Bit Resolution

Table 36. Analog Input Values for the PCI-6032E

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	1	Pos FS	9.9900000	9.9890457	9.9909543	9.9888759	9.9911241
20	bipolar	1	Neg FS	-9.9900000	-9.9909543	-9.9890457	-9.9911241	-9.9888759
20	bipolar	2	Pos FS	4.9950000	4.9932701	4.9967299	4.9931852	4.9968148
20	bipolar	2	Neg FS	-4.9950000	-4.9967299	-4.9932701	-4.9968148	-4.9931852
20	bipolar	5	Pos FS	1.9980000	1.9972877	1.9987123	1.9972537	1.9987463
20	bipolar	5	Neg FS	-1.9980000	-1.9987123	-1.9972877	-1.9987463	-1.9972537
20	bipolar	10	Pos FS	0.9990000	0.9986475	0.9993525	0.9986306	0.9993694
20	bipolar	10	Neg FS	-0.9990000	-0.9993525	-0.9986475	-0.9993694	-0.9986306
20	bipolar	20	Pos FS	0.4995000	0.4993197	0.4996803	0.4993112	0.4996888
20	bipolar	20	Neg FS	-0.4995000	-0.4996803	-0.4993197	-0.4996888	-0.4993112
20	bipolar	50	Pos FS	0.1998000	0.1997214	0.1998786	0.1997180	0.1998820
20	bipolar	50	Neg FS	-0.1998000	-0.1998786	-0.1997214	-0.1998820	-0.1997180
20	bipolar	100	Pos FS	0.0999000	0.0998573	0.0999427	0.0998556	0.0999444
20	bipolar	100	Neg FS	-0.0999000	-0.0999427	-0.0998573	-0.0999444	-0.0998556
10	unipolar	1	Pos FS	9.9900000	9.9892002	9.9907998	9.9890303	9.9909697
10	unipolar	1	Neg FS	0.0100000	0.0096393	0.0103607	0.0096391	0.0103609
10	unipolar	2	Pos FS	4.9950000	4.9933473	4.9966527	4.9932624	4.9967376

Table 36. Analog Input Values for the PCI-6032E (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	2	Neg FS	0.0050000	0.0048144	0.0051856	0.0048143	0.0051857
10	unipolar	5	Pos FS	1.9980000	1.9973340	1.9986660	1.9973001	1.9986999
10	unipolar	5	Neg FS	0.0020000	0.0019209	0.0020791	0.0019208	0.0020792
10	unipolar	10	Pos FS	0.9990000	0.9986630	0.9993370	0.9986460	0.9993540
10	unipolar	10	Neg FS	0.0010000	0.0009564	0.0010436	0.0009564	0.0010436
10	unipolar	20	Pos FS	0.4995000	0.4993274	0.4996726	0.4993189	0.4996811
10	unipolar	20	Neg FS	0.0005000	0.0004741	0.0005259	0.0004741	0.0005259
10	unipolar	50	Pos FS	0.1998000	0.1997261	0.1998739	0.1997227	0.1998773
10	unipolar	50	Neg FS	0.0002000	0.0001848	0.0002152	0.0001847	0.0002153
10	unipolar	100	Pos FS	0.0999000	0.0998589	0.0999411	0.0998573	0.0999427
10	unipolar	100	Neg FS	0.0001000	0.0000883	0.0001117	0.0000883	0.0001117

Table 37. Counter Values for the PCI-6032E

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

PCI-6033E—16-Bit Resolution

Table 38. Analog Input Values for the PCI-6033E

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	1	Pos FS	9.9900000	9.9890457	9.9909543	9.9888759	9.9911241
20	bipolar	1	Neg FS	-9.9900000	-9.9909543	-9.9890457	-9.9911241	-9.9888759
20	bipolar	2	Pos FS	4.9950000	4.9932701	4.9967299	4.9931852	4.9968148
20	bipolar	2	Neg FS	-4.9950000	-4.9967299	-4.9932701	-4.9968148	-4.9931852
20	bipolar	5	Pos FS	1.9980000	1.9972877	1.9987123	1.9972537	1.9987463
20	bipolar	5	Neg FS	-1.9980000	-1.9987123	-1.9972877	-1.9987463	-1.9972537
20	bipolar	10	Pos FS	0.9990000	0.9986475	0.9993525	0.9986306	0.9993694
20	bipolar	10	Neg FS	-0.9990000	-0.9993525	-0.9986475	-0.9993694	-0.9986306
20	bipolar	20	Pos FS	0.4995000	0.4993197	0.4996803	0.4993112	0.4996888
20	bipolar	20	Neg FS	-0.4995000	-0.4996803	-0.4993197	-0.4996888	-0.4993112
20	bipolar	50	Pos FS	0.1998000	0.1997214	0.1998786	0.1997180	0.1998820
20	bipolar	50	Neg FS	-0.1998000	-0.1998786	-0.1997214	-0.1998820	-0.1997180
20	bipolar	100	Pos FS	0.0999000	0.0998573	0.0999427	0.0998556	0.0999444
20	bipolar	100	Neg FS	-0.0999000	-0.0999427	-0.0998573	-0.0999444	-0.0998556
10	unipolar	1	Pos FS	9.9900000	9.9892002	9.9907998	9.9890303	9.9909697
10	unipolar	1	Neg FS	0.0100000	0.0096393	0.0103607	0.0096391	0.0103609
10	unipolar	2	Pos FS	4.9950000	4.9933473	4.9966527	4.9932624	4.9967376

Table 38. Analog Input Values for the PCI-6033E (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	2	Neg FS	0.0050000	0.0048144	0.0051856	0.0048143	0.0051857
10	unipolar	5	Pos FS	1.9980000	1.9973340	1.9986660	1.9973001	1.9986999
10	unipolar	5	Neg FS	0.0020000	0.0019209	0.0020791	0.0019208	0.0020792
10	unipolar	10	Pos FS	0.9990000	0.9986630	0.9993370	0.9986460	0.9993540
10	unipolar	10	Neg FS	0.0010000	0.0009564	0.0010436	0.0009564	0.0010436
10	unipolar	20	Pos FS	0.4995000	0.4993274	0.4996726	0.4993189	0.4996811
10	unipolar	20	Neg FS	0.0005000	0.0004741	0.0005259	0.0004741	0.0005259
10	unipolar	50	Pos FS	0.1998000	0.1997261	0.1998739	0.1997227	0.1998773
10	unipolar	50	Neg FS	0.0002000	0.0001848	0.0002152	0.0001847	0.0002153
10	unipolar	100	Pos FS	0.0999000	0.0998589	0.0999411	0.0998573	0.0999427
10	unipolar	100	Neg FS	0.0001000	0.0000883	0.0001117	0.0000883	0.0001117

Table 39. Counter Values for the PCI-6033E

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

PCI-6071E—12-Bit Resolution

Table 40. Analog Input Values for the PCI-6071E

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	bipolar	0.5	Pos FS	9.9900000	9.9783206	10.0016794	9.9779010	10.0020990
10	bipolar	0.5	Neg FS	-9.9900000	-10.0016794	-9.9783206	-10.0020990	-9.9779010
10	bipolar	1	Pos FS	4.9950000	4.9904011	4.9995989	4.9901913	4.9998087
10	bipolar	1	Neg FS	-4.9950000	-4.9995989	-4.9904011	-4.9998087	-4.9901913
10	bipolar	2	Pos FS	2.4975000	2.4945672	2.5004328	2.4944623	2.5005377
10	bipolar	2	Neg FS	-2.4975000	-2.5004328	-2.4945672	-2.5005377	-2.4944623
10	bipolar	5	Pos FS	0.9990000	0.9978170	1.0001830	0.9977751	1.0002249
10	bipolar	5	Neg FS	-0.9990000	-1.0001830	-0.9978170	-1.0002249	-0.9977751
10	bipolar	10	Pos FS	0.4995000	0.4989001	0.5000999	0.4988791	0.5001209
10	bipolar	10	Neg FS	-0.4995000	-0.5000999	-0.4989001	-0.5001209	-0.4988791
10	bipolar	20	Pos FS	0.2497500	0.2494412	0.2500588	0.2494307	0.2500693
10	bipolar	20	Neg FS	-0.2497500	-0.2500588	-0.2494412	-0.2500693	-0.2494307
10	bipolar	50	Pos FS	0.0999000	0.0997658	0.1000342	0.0997616	0.1000384
10	bipolar	50	Neg FS	-0.0999000	-0.1000342	-0.0997658	-0.1000384	-0.0997616
10	bipolar	100	Pos FS	0.0499500	0.0498742	0.0500258	0.0498721	0.0500279
10	bipolar	100	Neg FS	-0.0499500	-0.0500258	-0.0498742	-0.0500279	-0.0498721
10	unipolar	1	Pos FS	9.9900000	9.9840424	9.9959576	9.9836228	9.9963772

Table 40. Analog Input Values for the PCI-6071E (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	1	Neg FS	0.0100000	0.0067570	0.0132430	0.0067566	0.0132434
10	unipolar	2	Pos FS	4.9950000	4.9907635	4.9992365	4.9905537	4.9994463
10	unipolar	2	Neg FS	0.0050000	0.0033683	0.0066317	0.0033681	0.0066319
10	unipolar	5	Pos FS	1.9980000	1.9962955	1.9997045	1.9962116	1.9997884
10	unipolar	5	Neg FS	0.0020000	0.0013375	0.0026625	0.0013374	0.0026626
10	unipolar	10	Pos FS	0.9990000	0.9981393	0.9998607	0.9980974	0.9999026
10	unipolar	10	Neg FS	0.0010000	0.0006603	0.0013397	0.0006602	0.0013398
10	unipolar	20	Pos FS	0.4995000	0.4990609	0.4999391	0.4990399	0.4999601
10	unipolar	20	Neg FS	0.0005000	0.0003213	0.0006787	0.0003213	0.0006787
10	unipolar	50	Pos FS	0.1998000	0.1996136	0.1999864	0.1996052	0.1999948
10	unipolar	50	Neg FS	0.0002000	0.0001178	0.0002822	0.0001178	0.0002822
10	unipolar	100	Pos FS	0.0999000	0.0997982	0.1000018	0.0997940	0.1000060
10	unipolar	100	Neg FS	0.0001000	0.0000502	0.0001498	0.0000502	0.0001498

Table 41. Analog Output Values for the PCI-6071E

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9822988	9.9977012	9.9818792	9.9981208
20	bipolar	Neg FS	-9.9900000	-9.9977012	-9.9822988	-9.9981208	-9.9818792
10	unipolar	Pos FS	9.9900000	9.9847408	9.9952592	9.9843212	9.9956788
10	unipolar	Neg FS	0.0100000	0.0065072	0.0134928	0.0065068	0.0134932

Table 42. Counter Values for the PCI-6071E

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

PCI-MIO-16E-1—12-Bit Resolution

Table 43. Analog Input Values for the PCI-MIO-16E-1

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	bipolar	0.5	Pos FS	9.9900000	9.9783206	10.0016794	9.9779010	10.0020990
10	bipolar	0.5	Neg FS	-9.9900000	-10.0016794	-9.9783206	-10.0020990	-9.9779010
10	bipolar	1	Pos FS	4.9950000	4.9904011	4.9995989	4.9901913	4.9998087
10	bipolar	1	Neg FS	-4.9950000	-4.9995989	-4.9904011	-4.9998087	-4.9901913
10	bipolar	2	Pos FS	2.4975000	2.4945672	2.5004328	2.4944623	2.5005377
10	bipolar	2	Neg FS	-2.4975000	-2.5004328	-2.4945672	-2.5005377	-2.4944623
10	bipolar	5	Pos FS	0.9990000	0.9978170	1.0001830	0.9977751	1.0002249
10	bipolar	5	Neg FS	-0.9990000	-1.0001830	-0.9978170	-1.0002249	-0.9977751
10	bipolar	10	Pos FS	0.4995000	0.4989001	0.5000999	0.4988791	0.5001209
10	bipolar	10	Neg FS	-0.4995000	-0.5000999	-0.4989001	-0.5001209	-0.4988791
10	bipolar	20	Pos FS	0.2497500	0.2494412	0.2500588	0.2494307	0.2500693
10	bipolar	20	Neg FS	-0.2497500	-0.2500588	-0.2494412	-0.2500693	-0.2494307
10	bipolar	50	Pos FS	0.0999000	0.0997658	0.1000342	0.0997616	0.1000384
10	bipolar	50	Neg FS	-0.0999000	-0.1000342	-0.0997658	-0.1000384	-0.0997616
10	bipolar	100	Pos FS	0.0499500	0.0498742	0.0500258	0.0498721	0.0500279
10	bipolar	100	Neg FS	-0.0499500	-0.0500258	-0.0498742	-0.0500279	-0.0498721
10	unipolar	1	Pos FS	9.9900000	9.9840424	9.9959576	9.9836228	9.9963772

Table 43. Analog Input Values for the PCI-MIO-16E-1 (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	1	Neg FS	0.0100000	0.0067570	0.0132430	0.0067566	0.0132434
10	unipolar	2	Pos FS	4.9950000	4.9907635	4.9992365	4.9905537	4.9994463
10	unipolar	2	Neg FS	0.0050000	0.0033683	0.0066317	0.0033681	0.0066319
10	unipolar	5	Pos FS	1.9980000	1.9962955	1.9997045	1.9962116	1.9997884
10	unipolar	5	Neg FS	0.0020000	0.0013375	0.0026625	0.0013374	0.0026626
10	unipolar	10	Pos FS	0.9990000	0.9981393	0.9998607	0.9980974	0.9999026
10	unipolar	10	Neg FS	0.0010000	0.0006603	0.0013397	0.0006602	0.0013398
10	unipolar	20	Pos FS	0.4995000	0.4990609	0.4999391	0.4990399	0.4999601
10	unipolar	20	Neg FS	0.0005000	0.0003213	0.0006787	0.0003213	0.0006787
10	unipolar	50	Pos FS	0.1998000	0.1996136	0.1999864	0.1996052	0.1999948
10	unipolar	50	Neg FS	0.0002000	0.0001178	0.0002822	0.0001178	0.0002822
10	unipolar	100	Pos FS	0.0999000	0.0997982	0.1000018	0.0997940	0.1000060
10	unipolar	100	Neg FS	0.0001000	0.0000502	0.0001498	0.0000502	0.0001498

Table 44. Analog Output Values for the PCI-MIO-16E-1

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9822988	9.9977012	9.9818792	9.9981208
20	bipolar	Neg FS	-9.9900000	-9.9977012	-9.9822988	-9.9981208	-9.9818792
10	unipolar	Pos FS	9.9900000	9.9847408	9.9952592	9.9843212	9.9956788
10	unipolar	Neg FS	0.0100000	0.0065072	0.0134928	0.0065068	0.0134932

Table 45. Counter Values for the PCI-MIO-16E-1

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

PCI-MIO-16E-4—12-Bit Resolution

Table 46. Analog Input Values for the PCI-MIO-16E-4

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	bipolar	0.5	Pos FS	9.9900000	9.9773166	10.0026834	9.9768970	10.0031030
10	bipolar	0.5	Neg FS	-9.9900000	-10.0026834	-9.9773166	-10.0031030	-9.9768970
10	bipolar	1	Pos FS	4.9950000	4.9898971	5.0001029	4.9896873	5.0003127
10	bipolar	1	Neg FS	-4.9950000	-5.0001029	-4.9898971	-5.0003127	-4.9896873
10	bipolar	2	Pos FS	2.4975000	2.4943132	2.5006868	2.4942083	2.5007917
10	bipolar	2	Neg FS	-2.4975000	-2.5006868	-2.4943132	-2.5007917	-2.4942083
10	bipolar	5	Pos FS	0.9990000	0.9977130	1.0002870	0.9976711	1.0003289
10	bipolar	5	Neg FS	-0.9990000	-1.0002870	-0.9977130	-1.0003289	-0.9976711
10	bipolar	10	Pos FS	0.4995000	0.4988461	0.5001539	0.4988251	0.5001749
10	bipolar	10	Neg FS	-0.4995000	-0.5001539	-0.4988461	-0.5001749	-0.4988251
10	bipolar	20	Pos FS	0.2497500	0.2494125	0.2500875	0.2494020	0.2500980
10	bipolar	20	Neg FS	-0.2497500	-0.2500875	-0.2494125	-0.2500980	-0.2494020
10	bipolar	50	Pos FS	0.0999000	0.0997519	0.1000481	0.0997477	0.1000523
10	bipolar	50	Neg FS	-0.0999000	-0.1000481	-0.0997519	-0.1000523	-0.0997477
10	bipolar	100	Pos FS	0.0499500	0.0498653	0.0500347	0.0498632	0.0500368
10	bipolar	100	Neg FS	-0.0499500	-0.0500347	-0.0498653	-0.0500368	-0.0498632
10	unipolar	1	Pos FS	9.9900000	9.9835384	9.9964616	9.9831188	9.9968812

Table 46. Analog Input Values for the PCI-MIO-16E-4 (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	1	Neg FS	0.0100000	0.0062530	0.0137470	0.0062526	0.0137474
10	unipolar	2	Pos FS	4.9950000	4.9905095	4.9994905	4.9902997	4.9997003
10	unipolar	2	Neg FS	0.0050000	0.0031143	0.0068857	0.0031141	0.0068859
10	unipolar	5	Pos FS	1.9980000	1.9961915	1.9998085	1.9961076	1.9998924
10	unipolar	5	Neg FS	0.0020000	0.0012335	0.0027665	0.0012334	0.0027666
10	unipolar	10	Pos FS	0.9990000	0.9980853	0.9999147	0.9980434	0.9999566
10	unipolar	10	Neg FS	0.0010000	0.0006063	0.0013937	0.0006062	0.0013938
10	unipolar	20	Pos FS	0.4995000	0.4990322	0.4999678	0.4990112	0.4999888
10	unipolar	20	Neg FS	0.0005000	0.0002926	0.0007074	0.0002926	0.0007074
10	unipolar	50	Pos FS	0.1998000	0.1995997	0.2000003	0.1995913	0.2000087
10	unipolar	50	Neg FS	0.0002000	0.0001039	0.0002961	0.0001039	0.0002961
10	unipolar	100	Pos FS	0.0999000	0.0997893	0.1000107	0.0997851	0.1000149
10	unipolar	100	Neg FS	0.0001000	0.0000413	0.0001587	0.0000413	0.0001587

Table 47. Analog Output Values for the PCI-MIO-16E-4

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9822988	9.9977012	9.9818792	9.9981208
20	bipolar	Neg FS	-9.9900000	-9.9977012	-9.9822988	-9.9981208	-9.9818792
10	unipolar	Pos FS	9.9900000	9.9847408	9.9952592	9.9843212	9.9956788
10	unipolar	Neg FS	0.0100000	0.0065072	0.0134928	0.0065068	0.0134932

Table 48. Counter Values for the PCI-MIO-16E-4

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

PCI-MIO-16XE-10—16-Bit Resolution

Table 49. Analog Input Values for the PCI-MIO-16XE-10

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	1	Pos FS	9.9900000	9.9890457	9.9909543	9.9888759	9.9911241
20	bipolar	1	Neg FS	-9.9900000	-9.9909543	-9.9890457	-9.9911241	-9.9888759
20	bipolar	2	Pos FS	4.9950000	4.9932701	4.9967299	4.9931852	4.9968148
20	bipolar	2	Neg FS	-4.9950000	-4.9967299	-4.9932701	-4.9968148	-4.9931852
20	bipolar	5	Pos FS	1.9980000	1.9972877	1.9987123	1.9972537	1.9987463
20	bipolar	5	Neg FS	-1.9980000	-1.9987123	-1.9972877	-1.9987463	-1.9972537
20	bipolar	10	Pos FS	0.9990000	0.9986475	0.9993525	0.9986306	0.9993694
20	bipolar	10	Neg FS	-0.9990000	-0.9993525	-0.9986475	-0.9993694	-0.9986306
20	bipolar	20	Pos FS	0.4995000	0.4993197	0.4996803	0.4993112	0.4996888
20	bipolar	20	Neg FS	-0.4995000	-0.4996803	-0.4993197	-0.4996888	-0.4993112
20	bipolar	50	Pos FS	0.1998000	0.1997214	0.1998786	0.1997180	0.1998820
20	bipolar	50	Neg FS	-0.1998000	-0.1998786	-0.1997214	-0.1998820	-0.1997180
20	bipolar	100	Pos FS	0.0999000	0.0998573	0.0999427	0.0998556	0.0999444
20	bipolar	100	Neg FS	-0.0999000	-0.0999427	-0.0998573	-0.0999444	-0.0998556
10	unipolar	1	Pos FS	9.9900000	9.9892002	9.9907998	9.9890303	9.9909697
10	unipolar	1	Neg FS	0.0100000	0.0096393	0.0103607	0.0096391	0.0103609
10	unipolar	2	Pos FS	4.9950000	4.9933473	4.9966527	4.9932624	4.9967376

Table 49. Analog Input Values for the PCI-MIO-16XE-10 (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	2	Neg FS	0.0050000	0.0048144	0.0051856	0.0048143	0.0051857
10	unipolar	5	Pos FS	1.9980000	1.9973340	1.9986660	1.9973001	1.9986999
10	unipolar	5	Neg FS	0.0020000	0.0019209	0.0020791	0.0019208	0.0020792
10	unipolar	10	Pos FS	0.9990000	0.9986630	0.9993370	0.9986460	0.9993540
10	unipolar	10	Neg FS	0.0010000	0.0009564	0.0010436	0.0009564	0.0010436
10	unipolar	20	Pos FS	0.4995000	0.4993274	0.4996726	0.4993189	0.4996811
10	unipolar	20	Neg FS	0.0005000	0.0004741	0.0005259	0.0004741	0.0005259
10	unipolar	50	Pos FS	0.1998000	0.1997261	0.1998739	0.1997227	0.1998773
10	unipolar	50	Neg FS	0.0002000	0.0001848	0.0002152	0.0001847	0.0002153
10	unipolar	100	Pos FS	0.0999000	0.0998589	0.0999411	0.0998573	0.0999427
10	unipolar	100	Neg FS	0.0001000	0.0000883	0.0001117	0.0000883	0.0001117

Table 50. Analog Output Values for the PCI-MIO-16XE-10

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9887375	9.9912626	9.9885676	9.9914324
20	bipolar	Neg FS	-9.9900000	-9.9912626	-9.9887375	-9.9914324	-9.9885676
10	unipolar	Pos FS	9.9900000	9.9889665	9.9910336	9.9887966	9.9912034
10	unipolar	Neg FS	0.0100000	0.0094156	0.0105845	0.0094154	0.0105846

Table 51. Counter Values for the PCI-MIO-16XE-10

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

PCI-MIO-16XE-50—16-Bit Resolution

Table 52. Analog Input Values for the PCI-MIO-16XE-50

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	1	Pos FS	9.9900000	9.9890188	9.9909812	9.9885992	9.9914008
20	bipolar	1	Neg FS	-9.9900000	-9.9909812	-9.9890188	-9.9914008	-9.9885992
20	bipolar	2	Pos FS	4.9950000	4.9937582	4.9962419	4.9935484	4.9964516
20	bipolar	2	Neg FS	-4.9950000	-4.9962419	-4.9937582	-4.9964516	-4.9935484
20	bipolar	10	Pos FS	0.9990000	0.9987483	0.9992517	0.9987064	0.9992936
20	bipolar	10	Neg FS	-0.9990000	-0.9992517	-0.9987483	-0.9992936	-0.9987064
20	bipolar	100	Pos FS	0.0999000	0.0998512	0.0999488	0.0998470	0.0999530
20	bipolar	100	Neg FS	-0.0999000	-0.0999488	-0.0998512	-0.0999530	-0.0998470
10	unipolar	1	Pos FS	9.9900000	9.9891737	9.9908263	9.9887541	9.9912459
10	unipolar	1	Neg FS	0.0100000	0.0097525	0.0102475	0.0097521	0.0102479
10	unipolar	2	Pos FS	4.9950000	4.9933361	4.9966639	4.9931263	4.9968737
10	unipolar	2	Neg FS	0.0050000	0.0048730	0.0051270	0.0048728	0.0051272
10	unipolar	10	Pos FS	0.9990000	0.9986640	0.9993360	0.9986220	0.9993780
10	unipolar	10	Neg FS	0.0010000	0.0009714	0.0010286	0.0009713	0.0010287
10	unipolar	100	Pos FS	0.0999000	0.0998527	0.0999473	0.0998485	0.0999515
10	unipolar	100	Neg FS	0.0001000	0.0000934	0.0001066	0.0000934	0.0001066

Table 53. Analog Output Values for the PCI-MIO-16XE-50

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9832234	9.9967766	9.9828038	9.9971962
20	bipolar	Neg FS	-9.9900000	-9.9967766	-9.9832234	-9.9971962	-9.9828038

Table 54. Counter Values for the PCI-MIO-16XE-50

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

PXI-6040E—12-Bit Resolution

Table 55. Analog Input Values for the PXI-6040E

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	bipolar	0.5	Pos FS	9.9900000	9.9773166	10.0026834	9.9768970	10.0031030
10	bipolar	0.5	Neg FS	-9.9900000	-10.0026834	-9.9773166	-10.0031030	-9.9768970
10	bipolar	1	Pos FS	4.9950000	4.9898971	5.0001029	4.9896873	5.0003127
10	bipolar	1	Neg FS	-4.9950000	-5.0001029	-4.9898971	-5.0003127	-4.9896873
10	bipolar	2	Pos FS	2.4975000	2.4943132	2.5006868	2.4942083	2.5007917
10	bipolar	2	Neg FS	-2.4975000	-2.5006868	-2.4943132	-2.5007917	-2.4942083
10	bipolar	5	Pos FS	0.9990000	0.9977130	1.0002870	0.9976711	1.0003289
10	bipolar	5	Neg FS	-0.9990000	-1.0002870	-0.9977130	-1.0003289	-0.9976711
10	bipolar	10	Pos FS	0.4995000	0.4988461	0.5001539	0.4988251	0.5001749
10	bipolar	10	Neg FS	-0.4995000	-0.5001539	-0.4988461	-0.5001749	-0.4988251
10	bipolar	20	Pos FS	0.2497500	0.2494125	0.2500875	0.2494020	0.2500980
10	bipolar	20	Neg FS	-0.2497500	-0.2500875	-0.2494125	-0.2500980	-0.2494020
10	bipolar	50	Pos FS	0.0999000	0.0997519	0.1000481	0.0997477	0.1000523
10	bipolar	50	Neg FS	-0.0999000	-0.1000481	-0.0997519	-0.1000523	-0.0997477
10	bipolar	100	Pos FS	0.0499500	0.0498653	0.0500347	0.0498632	0.0500368
10	bipolar	100	Neg FS	-0.0499500	-0.0500347	-0.0498653	-0.0500368	-0.0498632
10	unipolar	1	Pos FS	9.9900000	9.9835384	9.9964616	9.9831188	9.9968812

Table 55. Analog Input Values for the PXI-6040E (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	1	Neg FS	0.0100000	0.0062530	0.0137470	0.0062526	0.0137474
10	unipolar	2	Pos FS	4.9950000	4.9905095	4.9994905	4.9902997	4.9997003
10	unipolar	2	Neg FS	0.0050000	0.0031143	0.0068857	0.0031141	0.0068859
10	unipolar	5	Pos FS	1.9980000	1.9961915	1.9998085	1.9961076	1.9998924
10	unipolar	5	Neg FS	0.0020000	0.0012335	0.0027665	0.0012334	0.0027666
10	unipolar	10	Pos FS	0.9990000	0.9980853	0.9999147	0.9980434	0.9999566
10	unipolar	10	Neg FS	0.0010000	0.0006063	0.0013937	0.0006062	0.0013938
10	unipolar	20	Pos FS	0.4995000	0.4990322	0.4999678	0.4990112	0.4999888
10	unipolar	20	Neg FS	0.0005000	0.0002926	0.0007074	0.0002926	0.0007074
10	unipolar	50	Pos FS	0.1998000	0.1995997	0.2000003	0.1995913	0.2000087
10	unipolar	50	Neg FS	0.0002000	0.0001039	0.0002961	0.0001039	0.0002961
10	unipolar	100	Pos FS	0.0999000	0.0997893	0.1000107	0.0997851	0.1000149
10	unipolar	100	Neg FS	0.0001000	0.0000413	0.0001587	0.0000413	0.0001587

Table 56. Analog Output Values for the PXI-6040E

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9822988	9.9977012	9.9818792	9.9981208
20	bipolar	Neg FS	-9.9900000	-9.9977012	-9.9822988	-9.9981208	-9.9818792
10	unipolar	Pos FS	9.9900000	9.9847408	9.9952592	9.9843212	9.9956788
10	unipolar	Neg FS	0.0100000	0.0065072	0.0134928	0.0065068	0.0134932

Table 57. Counter Values for the PXI-6040E

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

PXI-6070E—12-Bit Resolution

Table 58. Analog Input Values for the PXI-6070E

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	bipolar	0.5	Pos FS	9.9900000	9.9783206	10.0016794	9.9779010	10.0020990
10	bipolar	0.5	Neg FS	-9.9900000	-10.0016794	-9.9783206	-10.0020990	-9.9779010
10	bipolar	1	Pos FS	4.9950000	4.9904011	4.9995989	4.9901913	4.9998087
10	bipolar	1	Neg FS	-4.9950000	-4.9995989	-4.9904011	-4.9998087	-4.9901913
10	bipolar	2	Pos FS	2.4975000	2.4945672	2.5004328	2.4944623	2.5005377
10	bipolar	2	Neg FS	-2.4975000	-2.5004328	-2.4945672	-2.5005377	-2.4944623
10	bipolar	5	Pos FS	0.9990000	0.9978170	1.0001830	0.9977751	1.0002249
10	bipolar	5	Neg FS	-0.9990000	-1.0001830	-0.9978170	-1.0002249	-0.9977751
10	bipolar	10	Pos FS	0.4995000	0.4989001	0.5000999	0.4988791	0.5001209
10	bipolar	10	Neg FS	-0.4995000	-0.5000999	-0.4989001	-0.5001209	-0.4988791
10	bipolar	20	Pos FS	0.2497500	0.2494412	0.2500588	0.2494307	0.2500693
10	bipolar	20	Neg FS	-0.2497500	-0.2500588	-0.2494412	-0.2500693	-0.2494307
10	bipolar	50	Pos FS	0.0999000	0.0997658	0.1000342	0.0997616	0.1000384
10	bipolar	50	Neg FS	-0.0999000	-0.1000342	-0.0997658	-0.1000384	-0.0997616
10	bipolar	100	Pos FS	0.0499500	0.0498742	0.0500258	0.0498721	0.0500279
10	bipolar	100	Neg FS	-0.0499500	-0.0500258	-0.0498742	-0.0500279	-0.0498721
10	unipolar	1	Pos FS	9.9900000	9.9840424	9.9959576	9.9836228	9.9963772

Table 58. Analog Input Values for the PXI-6070E (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	1	Neg FS	0.0100000	0.0067570	0.0132430	0.0067566	0.0132434
10	unipolar	2	Pos FS	4.9950000	4.9907635	4.9992365	4.9905537	4.9994463
10	unipolar	2	Neg FS	0.0050000	0.0033683	0.0066317	0.0033681	0.0066319
10	unipolar	5	Pos FS	1.9980000	1.9962955	1.9997045	1.9962116	1.9997884
10	unipolar	5	Neg FS	0.0020000	0.0013375	0.0026625	0.0013374	0.0026626
10	unipolar	10	Pos FS	0.9990000	0.9981393	0.9998607	0.9980974	0.9999026
10	unipolar	10	Neg FS	0.0010000	0.0006603	0.0013397	0.0006602	0.0013398
10	unipolar	20	Pos FS	0.4995000	0.4990609	0.4999391	0.4990399	0.4999601
10	unipolar	20	Neg FS	0.0005000	0.0003213	0.0006787	0.0003213	0.0006787
10	unipolar	50	Pos FS	0.1998000	0.1996136	0.1999864	0.1996052	0.1999948
10	unipolar	50	Neg FS	0.0002000	0.0001178	0.0002822	0.0001178	0.0002822
10	unipolar	100	Pos FS	0.0999000	0.0997982	0.1000018	0.0997940	0.1000060
10	unipolar	100	Neg FS	0.0001000	0.0000502	0.0001498	0.0000502	0.0001498

Table 59. Analog Output Values for the PXI-6070E

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9822988	9.9977012	9.9818792	9.9981208
20	bipolar	Neg FS	-9.9900000	-9.9977012	-9.9822988	-9.9981208	-9.9818792
10	unipolar	Pos FS	9.9900000	9.9847408	9.9952592	9.9843212	9.9956788
10	unipolar	Neg FS	0.0100000	0.0065072	0.0134928	0.0065068	0.0134932

Table 60. Counter Values for the PXI-6070E

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

VXI-MIO-64E-1—12-Bit Resolution

Table 61. Analog Input Values for the VXI-MIO-64E-1

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	bipolar	0.5	Pos FS	9.9900000	9.9787702	10.0012298	9.9786003	10.0013997
10	bipolar	0.5	Neg FS	-9.9900000	-10.0012298	-9.9787702	-10.0013997	-9.9786003
10	bipolar	1	Pos FS	4.9950000	4.9906258	4.9993742	4.9905409	4.9994591
10	bipolar	1	Neg FS	-4.9950000	-4.9993742	-4.9906258	-4.9994591	-4.9905409
10	bipolar	2	Pos FS	2.4975000	2.4946796	2.5003204	2.4946371	2.5003629
10	bipolar	2	Neg FS	-2.4975000	-2.5003204	-2.4946796	-2.5003629	-2.4946371
10	bipolar	5	Pos FS	0.9990000	0.9978620	1.0001380	0.9978450	1.0001550
10	bipolar	5	Neg FS	-0.9990000	-1.0001380	-0.9978620	-1.0001550	-0.9978450
10	bipolar	10	Pos FS	0.4995000	0.4989225	0.5000775	0.4989140	0.5000860
10	bipolar	10	Neg FS	-0.4995000	-0.5000775	-0.4989225	-0.5000860	-0.4989140
10	bipolar	20	Pos FS	0.2497500	0.2494528	0.2500472	0.2494485	0.2500515
10	bipolar	20	Neg FS	-0.2497500	-0.2500472	-0.2494528	-0.2500515	-0.2494485
10	bipolar	50	Pos FS	0.0999000	0.0997703	0.1000297	0.0997686	0.1000314
10	bipolar	50	Neg FS	-0.0999000	-0.1000297	-0.0997703	-0.1000314	-0.0997686
10	bipolar	100	Pos FS	0.0499500	0.0498766	0.0500234	0.0498757	0.0500243
10	bipolar	100	Neg FS	-0.0499500	-0.0500234	-0.0498766	-0.0500243	-0.0498757
10	unipolar	1	Pos FS	9.9900000	9.9844920	9.9955080	9.9843221	9.9956779

Table 61. Analog Input Values for the VXI-MIO-64E-1 (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	1	Neg FS	0.0100000	0.0067574	0.0132426	0.0067573	0.0132427
10	unipolar	2	Pos FS	4.9950000	4.9909883	4.9990117	4.9909034	4.9990966
10	unipolar	2	Neg FS	0.0050000	0.0033685	0.0066315	0.0033684	0.0066316
10	unipolar	5	Pos FS	1.9980000	1.9963855	1.9996145	1.9963515	1.9996485
10	unipolar	5	Neg FS	0.0020000	0.0013375	0.0026625	0.0013375	0.0026625
10	unipolar	10	Pos FS	0.9990000	0.9981843	0.9998157	0.9981673	0.9998327
10	unipolar	10	Neg FS	0.0010000	0.0006603	0.0013397	0.0006603	0.0013397
10	unipolar	20	Pos FS	0.4995000	0.4990836	0.4999164	0.4990751	0.4999249
10	unipolar	20	Neg FS	0.0005000	0.0003217	0.0006783	0.0003217	0.0006783
10	unipolar	50	Pos FS	0.1998000	0.1996227	0.1999773	0.1996193	0.1999807
10	unipolar	50	Neg FS	0.0002000	0.0001179	0.0002821	0.0001179	0.0002821
10	unipolar	100	Pos FS	0.0999000	0.0998027	0.0999973	0.0998010	0.0999990
10	unipolar	100	Neg FS	0.0001000	0.0000504	0.0001496	0.0000504	0.0001496

Table 62. Analog Output Values for the VXI-MIO-64E-1

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9827483	9.9972517	9.9825785	9.9974215
20	bipolar	Neg FS	-9.9900000	-9.9972517	-9.9827483	-9.9974215	-9.9825785
10	unipolar	Pos FS	9.9900000	9.9851903	9.9948097	9.9850205	9.9949795
10	unipolar	Neg FS	0.0100000	0.0065077	0.0134923	0.0065075	0.0134925

Table 63. Counter Values for the VXI-MIO-64E-1

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005

VXI-MIO-64XE-10—16-Bit Resolution

Table 64. Analog Input Values for the VXI-MIO-64XE-10

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	1	Pos FS	9.9900000	9.9890457	9.9909543	9.9888759	9.9911241
20	bipolar	1	Neg FS	-9.9900000	-9.9909543	-9.9890457	-9.9911241	-9.9888759
20	bipolar	2	Pos FS	4.9950000	4.9932701	4.9967299	4.9931852	4.9968148
20	bipolar	2	Neg FS	-4.9950000	-4.9967299	-4.9932701	-4.9968148	-4.9931852
20	bipolar	5	Pos FS	1.9980000	1.9972877	1.9987123	1.9972537	1.9987463
20	bipolar	5	Neg FS	-1.9980000	-1.9987123	-1.9972877	-1.9987463	-1.9972537
20	bipolar	10	Pos FS	0.9990000	0.9986475	0.9993525	0.9986306	0.9993694
20	bipolar	10	Neg FS	-0.9990000	-0.9993525	-0.9986475	-0.9993694	-0.9986306
20	bipolar	20	Pos FS	0.4995000	0.4993197	0.4996803	0.4993112	0.4996888
20	bipolar	20	Neg FS	-0.4995000	-0.4996803	-0.4993197	-0.4996888	-0.4993112
20	bipolar	50	Pos FS	0.1998000	0.1997214	0.1998786	0.1997180	0.1998820
20	bipolar	50	Neg FS	-0.1998000	-0.1998786	-0.1997214	-0.1998820	-0.1997180
20	bipolar	100	Pos FS	0.0999000	0.0998573	0.0999427	0.0998556	0.0999444
20	bipolar	100	Neg FS	-0.0999000	-0.0999427	-0.0998573	-0.0999444	-0.0998556
10	unipolar	1	Pos FS	9.9900000	9.9892002	9.9907998	9.9890303	9.9909697
10	unipolar	1	Neg FS	0.0100000	0.0096393	0.0103607	0.0096391	0.0103609
10	unipolar	2	Pos FS	4.9950000	4.9933473	4.9966527	4.9932624	4.9967376

Table 64. Analog Input Values for the VXI-MIO-64XE-10 (Continued)

Range	Polarity	Gain	Test Point		24-Hour Ranges		1-Year Ranges	
			Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
10	unipolar	2	Neg FS	0.0050000	0.0048144	0.0051856	0.0048143	0.0051857
10	unipolar	5	Pos FS	1.9980000	1.9973340	1.9986660	1.9973001	1.9986999
10	unipolar	5	Neg FS	0.0020000	0.0019209	0.0020791	0.0019208	0.0020792
10	unipolar	10	Pos FS	0.9990000	0.9986630	0.9993370	0.9986460	0.9993540
10	unipolar	10	Neg FS	0.0010000	0.0009564	0.0010436	0.0009564	0.0010436
10	unipolar	20	Pos FS	0.4995000	0.4993274	0.4996726	0.4993189	0.4996811
10	unipolar	20	Neg FS	0.0005000	0.0004741	0.0005259	0.0004741	0.0005259
10	unipolar	50	Pos FS	0.1998000	0.1997261	0.1998739	0.1997227	0.1998773
10	unipolar	50	Neg FS	0.0002000	0.0001848	0.0002152	0.0001847	0.0002153
10	unipolar	100	Pos FS	0.0999000	0.0998589	0.0999411	0.0998573	0.0999427
10	unipolar	100	Neg FS	0.0001000	0.0000883	0.0001117	0.0000883	0.0001117

Table 65. Analog Output Values for the VXI-MIO-64XE-10

Range	Polarity	Test Point		24-Hour Ranges		1-Year Ranges	
		Location	Value (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)	Upper Limit (V)
20	bipolar	Pos FS	9.9900000	9.9887375	9.9912626	9.9885676	9.9914324
20	bipolar	Neg FS	-9.9900000	-9.9912626	-9.9887375	-9.9914324	-9.9885676
10	unipolar	Pos FS	9.9900000	9.9889665	9.9910336	9.9887966	9.9912034
10	unipolar	Neg FS	0.0100000	0.0094156	0.0105845	0.0094154	0.0105846

Table 66. Counter Values for the VXI-MIO-64XE-10

Set Point (MHz)	Upper Limit (MHz)	Lower Limit (MHz)
5	4.9995	5.0005